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MATHUR (R. L.), MATHUR (B. L.), & SEHGAL (S. P.). **Studies on a leaf spot disease of Spinach caused by Cladosporium variabile (Cooke) de Vries in Rajasthan.**—*Indian Phytopath.*, **12** (*1959*), 2, pp. 161–163, [1960].

In the Kota district, a prickly-seeded spinach var. was attacked by *C. variabile* [cf. **22**, 179; **26**, 265 (Padwick III)], which causes whitish, water-soaked spots 1–3 mm. diam. on the upper leaf surface. The fungus failed to attack 4 other host plants tested, including smooth-leaved (round seeded) spinach. In culture the best N source was ammonium tartrate, the best C source maltose, opt. temp. 23° C., and opt. pH 5·5.

SKOTLAND (C. B.). **Attempts to control Sclerotinia rot on irrigated Lettuce.**—*Plant Dis. Reptr*, **45**, 1, pp. 51–53, 1961.

At Irrigation Exp. Sta., Prosser, Wash., various treatments of lettuce rot (*S. sclerotiorum*) [cf. **38**, 114] with terraclor gave inconsistent results over 2 yr. (1957–8), though in the 2nd yr. a spray treatment of 20 lb. 75% W.P./acre before the 1st ditching, followed by another afterwards, gave 50% more healthy plants than unsprayed. Vapam and calcium cyanamide were ineffective. All sprays were phytotoxic.

KATSURA (K.) & MIYAZAKI (S.). **Leaf penetration by Phytophthora capsici Leonian.**—*Sci. Rep. Kyoto Univ. Agric.* 12, pp. 65–69, 2 fig., 1960. [Jap. Abs. from Engl. summ.]

Zoospores of *P. capsici* [**39**, 671] encyst on the surface of *Capsicum* leaves and penetrate either directly by a germ tube, by an infection peg from an appressorium, or by a germ tube from a minute sporangium into an epidermal cell, occasionally through stomata. Penetration is completed 4 hr. after inoculation, and lesions develop in 14 hr.

MELIKOVA (Mme S. A.). Поражаемость сортов Перца пятнистостью. [The susceptibility of Pepper varieties to spot diseases.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **5**, 11, p. 57, 1960.

The incidence of brown or black spot of pepper [*Capsicum*] (*Pseudomonas* [*syringae* var.] *capsici* [cf. **38**, 346] sometimes also with *Alternaria tenuis*) was evaluated by the Maĭkop exp. Sta., All-Union Plant Cultivation Inst., U.S.S.R. The vars. Rannīĭ kruglўĭ, Krupnўĭ sladkiĭ, Rotunda 449, and Bolgarskiĭ 1567, and the Hungarian samples 1597 and 1598, German 3015, and Argentinian 3035 were relatively resistant.

BHARGAVA (K. S.) & JOSHI (R. D.). **Detection of Watermelon mosaic virus in Uttar Pradesh.**—*Curr. Sci.*, **29**, 11, pp. 443–444, 5 fig., 1960.

At Dept Bot., Gorakhpur Univ., U.P., a virus was obtained from vegetable marrows with mosaic symptoms differing from others previously described in India and was identified as watermelon mosaic [cf. **34**, 76].

KAPELLER (K.). **Védekezési kísérletek új növényvédőszerekkel a Fuszerpaprika rizoktoniás palántavésze ellen.** [Experiments with some new chemicals to control seedling blight of Red Pepper.]—*Növénytermelés*, **9**, 4, pp. 369–374, 2 fig., 1960. [Russ., Engl. summ.]

In glasshouse and hot-bed tests at the Agric. Res. Inst., Kalocsa, Hungary, red

pepper (*Capsicum annuum*) vars. Kalocsai E 15 and Szegedi 51–216 were sown in beds infested with *Rhizoctonia* [*Corticium*] *solani* [cf. **36**, 656] and covered with a 2–3 mm. thick soil layer containing olpisan (chloronitrobenzene; VEB Farbenfabrik), thiram (Bayer), brassisan, or brassicol (chloronitrobenzene; Farbwerke Hoechst), all at 50 g./sq. m., or fuclasin F (VEB Chemie) or horganyszürke (ZnO), each at 200 g./sq. m. Their evaluation 40 days later gave the following descending order of effectiveness: olpisan, thiram, brassicol, fuclasin F, brassisan, and horganyszürke. The phytotoxicity of brassisan necessitated an 8–10-day delay in sowing.

Filov (A. I.) (Editor). Бахчеводство. [Cucurbit Growing.]—568 pp., illus., Moscow, Sel'khozgiz, 1959. Roubles 9.05.

This book contains a sect. on diseases (pp. 493–520) by M. N. Rodigin. After a brief summary of their severity in cucurbit growing areas of the U.S.S.R., a detailed account is given of individual pathogens, symptoms, environmental factors, and control.

Latȳshev (D.). Шампиньоны в Совхозе. [Mushrooms at the State farm.]—Картофель Овощи [*Kartofel' Ovoshchi*], **5**, 10, pp. 44–46, 1960.

Details are given of bed preparation for the cultivation of mushrooms [**39**, 259] at the State farm 'Teplichnȳĭ', where the area of cultivation was increased in 1959–60 from 2,100 to 5,100 sq. m. In the absence of horse manure, dung from various animals was used and gave equally high yields. Planting was exclusively in ridges (40 cm. base, 30 cm. height, 15 cm. apart), the yield being $1\frac{1}{2}$ times higher than in flat beds. When the mycelium had grown 5–7 cm. diam., the ridges were cased with 3–4 cm. peat soil+3% chalk.

Tschierpe (H. J.). **Studies on the influence of carbon dioxide on the cultivated Mushroom. Parts I–VI.**—*M.G.A. Bull.* 122, pp. 43–45; 123, pp. 75–79; 124, pp. 106–115, 1 fig., 4 graphs; 125, pp. 147–150, 2 fig.; 126, pp. 197–205, 4 graphs; 127, pp. 239–245, 2 fig.; 128, pp. 288–295, 9 fig.; 129, pp. 355–362, 15 fig.; 130, pp. 403–408, 5 fig.; 131, pp. 455–460, 4 fig., 1960; 133, pp. 28–33, 1961. (Translated from *Gartenbauwiss.*, **24**, 1, pp. 18–75, 1959.)

This doctorate thesis from the Technische Univ., Berlin, gives a detailed review of the literature and describes experiments to show that the growth of mushroom mycelium is retarded by 2 vol. % CO_2 and completely inhibited by 32 vol. % [cf. **34**, 75]. Under commercial growing conditions the CO_2 content of the compost decreases during the development of the sporophores and is rarely $< 0{\cdot}3$ vol. %. The CO_2 content increases after casing and after a flush is completely picked, which suggests a connexion between CO_2 content and the phenomenon of flushes. Sporophores are killed by 11 vol. % CO_2, while concs. between 1·5 and 10% cause abnormal growth and prevent normal sporulation, which occurs between 1·5 and 0·5%, though normal sporophore formation requires concs. below 0·2%. It is suggested that the casing soil creates a CO_2 gradient from the compost to the air above it, fructification taking place in the region of this partial pressure gradient. [These articles are to be published by the M.G.A. as a booklet.]

W[ood] (F. C.). **Pleurotus passeckerianus.**—*Mushroom News* (W. Darlington & Sons Ltd.), **8**, 3, p. 49, 1 fig., 1961.

This once-common weed fungus of mushroom beds is described and illustrated. Improved methods of cultivation and especially the introduction of peat as a casing medium have resulted in a decrease in its occurrence and it is now comparatively rare.

CAUDWELL (A.) & POITOU (Mlle N.). **Interaction entre 'court noué' et 'flavescence dorée'.** [Interaction between 'court-noué' and golden flavescence.]—*C.R. Acad. Agric. Fr.*, **46**, 16, pp. 958–963, 10 graphs, 1960.

A field study in Armagnac and at the Sta. de Recherches Viticoles du Sud-Ouest showed that vines affected by court-noué [infectious degeneration virus] were less susceptible to golden flavescence [**38**, 53] as regards the rapidity with which infection develops and the severity of the 1st attack and of later ones occurring during the period of apparent recovery. The presence of infectious degeneration reduces the percentage of transmissions of golden flavescence by grafting and the likelihood of symptoms appearing on cuttings. A vine may be affected simultaneously by golden flavescence and 'panachure' (yellow mosaic) [virus: cf. **39**, 149; **40**, 263]. If golden flavescence is due to a complex of viruses, the viruses of infectious degeneration and of 'panachure' are not part of it.

PROTA (U.). **La degenerazione infettiva del Vitigno 'Cannonau'. Parte I: sintomatologia.** [Infectious degeneration of 'Cannonau' Vines. Part I: symptomatology.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **18**, pp. 314–335, 5 pl. (23 fig.), 1960.

The results are presented of observations during 1954–58 on 121 Cannonau vines of different ages, all grafted on Rupestris du Lot and growing in a part of Sardinia (Ogliastra) in which symptoms of infectious degeneration [cf. **37**, 569; **39**, 767, *et passim*] are very prevalent. In all, 41 different macroscopic symptoms of the condition were noted and these are described in descending order of frequency.

AMICI (A[DRIANA]), BALDACCI (E.), & REFATTI (E.). **In merito alla utilizzazione di piante test erbacee nella diagnostica della virosi della Vite (degenerazione infettiva) per inoculazione meccanica.** [On the utilization of herbaceous test plants in the diagnosis of Vine virosis (infectious degeneration) by mechanical inoculation.]—*Ann. Fac. Agr. Milano*, N.S., **7** (*1958*), pp. 41–48, 1959. [Engl. summ. Received Dec. 1960.]

In experiments at Univ. Milan [cf. **39**, 149] on the reported transmission to herbaceous plants of 3 viruses isolated from vines in Germany with symptoms of infectious chlorosis [**37**, 755; **39**, 148] sap from the leaves of vines growing in Italy with (1) foliar malformations, (2) symptoms of 'panachure', and (3) mosaic (spots with indistinct edge, mostly interveinal) was inoculated mechanically into 126 herbaceous plants of 13 spp., 28 of the plants being re-inoculated, the plants then being kept in daylight or else exposed to fluorescent lighting. No positive results were obtained, except for some aspecific reactions in the form of a pale green mosaic on *Datura stramonium*, which appeared after inoculation with vine sap, and after re-inoculation with sap from inoculated *D. stramonium* and tobacco, and a pale and dark green mosaic on tobacco [but see below].

BALDACCI (E.), AMICI (ADRIANA), BONOLA (PAOLA), BETTO (E.), FOGLIANI (G.), & REFATTI (E.). **Trasmissione su piante erbacee della virosi della Vite nota come 'degenerazione infettiva'.** [Transmission to herbaceous plants of the Vine virosis known as 'infectious degeneration'.]—*Ric. sci.*, **30**, 7, pp. 981–983, 1960. [Fr., Engl., Germ. summ.]

At the Univ. Milan the symptoms of infectious degeneration of the vine as known in Italy were transferred [cf. above] by various inoculation methods from 7 vine clones to *Impatiens holstani*, lucerne, tomato, tomato×*Lycopersicon pimpinellifolium*, and *Ammi majus*. Evidence confirming transmission from the vines to the herbaceous plants is adduced. The virus was subsequently transferred from the plants originally inoculated to others, including other spp. [A similar account appears in *Nature, Lond.*, **190**, 4773, pp. 371–372, 1961.]

Fogliani (G.), Ferraz (F. G. P.), Halpern (M. J.), & Relvas (Maria E. A.). **Alcuni processi metabolici in Viti sane e virosate.** [Some metabolic processes in healthy and virus-affected Vines.]—Reprinted from *Arch. port. Bioquím.*, **3**, 29 pp., 6 fig., 1959. [Port., Engl., Fr. summ. 47 ref.]

This is a report on preliminary electrophoretic and chromatographic studies in Portugal on healthy vines and those with symptoms of 'urticado' [cf. **39**, 148], 'infectious chlorosis', 'infectious malformation', and a complex of 'urticado' and 'infectious chlorosis' together. The work included investigation of a possible relationship between protein synthesis and the synthesis of virus proteins; the amino-acid content of the shoots and leaves; the organic acid and carbohydrate content; a possible relationship between virus infection and the respiratory processes; and a possible relationship between virus infection and photosynthetic activity.

The results showed that there was an increase in most of the amino-acids in 'infectious chlorosis' and 'urticado' but not in the 'infectious chlorosis-urticado' complex. In Rupestris du Lot vines with 'infectious chlorosis' or 'urticado' there was an increase in the oxalic tartaric zone and an absence of the lactic acid. In Fernão Pires vines there was a reduction in the oxalic-tartaric zone in vines affected by either condition but not in those with the complex of the two, in which there was an increase in citric and lactic acids. In leaves of both healthy and virus-affected vines saccharose, glucose, fructose, and an unidentified polyol were present.

Brückbauer (H.). **Eine Viruskrankheit an Aristolochia clematitis L.** [A virus disease on *A. clematitis*.]—*Z. PflKrankh.*, **67**, 8, pp. 479–483, 8 fig., 1960. [Engl. summ.]

A preliminary communication from the Landes- Lehr- und Forschungsanstalt für Wein- und Gartenbau, Neustadt/Weinstraße, on the recent discovery of striking mosaic-like symptoms on a single plant of *A. clematitis*, a common weed in Württemberg vineyards. Yellowish, ill-defined spots were unevenly distributed over the leaf blade. In some leaves the whole sections of the blade were chlorotic; in others there was clearly defined veinbanding. Colour ranged from pale yellow to almost whitish. Successful transmission to a range of hosts demonstrated a virus infection.

Šarič-Sabadoš (A.), Milatović (I.), & Masten (V.). **Peyronellaea glomerata als Erreger der Vertrocknung der Blüten und jungen Trauben der Weinrebe in Jugoslavija.** [*P. glomerata* as the agent of a drying of the flowers and young fruit of Vine in Yugoslavia.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **18**, pp. 101–107, 1 pl. (6 fig.), 1 fig., 1 map, 1960. [Yugoslav, Italian, Engl. summ. 12 ref.]

Since 1946 vines in certain parts of Yugoslavia have been attacked by *P. glomerata* [cf. **31**, 495] which caused up to 80% loss of yield; the young fruit bunches dried and cracks appeared on the young stalks. Satisfactory control was given by 2 pre-blossom applications of Bordeaux mixture (0·75–1% $CuSO_4$) and 2 post-blossom (1·5% $CuSO_4$).

Ochs (Gertrud). **Ergänzung zur Biologie von Pseudopeziza tracheiphila Müller-Thurgau.** [Further studies on the biology of *P. tracheiphila*.]—*Schweiz. Z. Pilzk.*, **38**, 12, pp. 173–176, 2 fig., 1 graph, 1960. [Engl. summ.]

Daily observations at Freiburg-im-Breisgau, Germany, of the leaves of grape vines over several growing periods revealed that the flight of ascospores of *P. tracheiphila* [cf. **39**, 368] begins at the end of Apr. and occurs only in the presence of liquid water. The spring apothecia are exhausted by the end of July, but in early autumn fully functioning late apothecia were found on current leaves.

6e Jaarverslag, Proefstation voor de Groenteteelt in de Volle Grond in Nederland, 1960. [Sixth annual report of the Experiment Station for Outdoor Vegetable Culture in the Netherlands, 1960.]—139 pp., 28 fig., 8 graphs, 1961.

The following information, *inter alia*, is contained in the sect. on diseases and pests (pp. 105–124) [cf. **39**, 652] covering studies by H. Jonge Poerink, C. Schaap, J. M. M. van Bakel, and J. de Kraker. Tip burn ('margins') increased in white cabbage [**40**, 389] during storage in direct ratio to the rise in temperature.

Control of damping-off and canker of cabbage caused by *Phoma lingam* was better effected by treating seed with warm water than by 'mercury wet' disinfection. Storage in an air-cooled barn reduced canker substantially, as did late cutting (best done *ca.* 15 Nov.).

After inoculation of 2 vars. of English crossbred lettuce with mosaic virus 1 [lettuce mosaic virus], seed from these produced, respectively, 1·7% and 2% of infected plants [cf. **38**, 556].

'Spring sickness' virus disease of carrots, transmitted by *Cavariella aegopodii* [cf. carrot motley dwarf: **40**, 2] was controlled to some extent by fogging with systox to kill the vector. Only a short feeding period was necessary for transmission and 5 carrot vars. tested proved equally susceptible. Attempts at mechanical transmission to 4 tobacco vars. failed.

Boletim Anual do Serviço de Fitopatologia, Secretaria da Agricultura, Estado do Rio Grande do Sul, 4 (*1959*), 26 pp., 1 graph, [? 1960].

This publication, to notify the stations of the Phytopathological Service of each other's current work, includes 3 sect.: plant breeding for disease resistance (in cereals and flax), fungal diseases, and bacteriology; the last two list pathogens by hosts.

Annual Report of the National Institute of Genetics, Japan, 10, 1959.—162 pp., 9 fig., 6 diag., 15 graphs, 1 map, 1960.

T. Narise reports (pp. 72–78) on tests at Peradeniya, Ceylon, of 3 populations of wild rice (*Oryza sativa* f. *spontanea*) for susceptibility to a Ceylon str. of *Piricularia oryzae* [cf. **39**, 374] by the leaf-sheath method. The T-4 population from Samalkot (Andhura, India) was on the whole highly resistant. In tests by K. Katsuya (pp. 76–77) *O. minuta* (W 0016) was resistant to strs. P-2 and 54-04, while *O. officinalis* W 0046, all strs. of *O. glaberrima*, W 0106 and W 0123 of *O. s.* var. *spontanea*, and W 0032 and W 0033 of *O. perennis* were resistant when inoculated by spraying and resistant or moderately susceptible by injection.

The 'albina' mutant of Einkorn wheat was susceptible to *Puccinia triticina* [*P. recondita*] 21 B and *P. graminis* f. sp. *tritici* 21 when inoculated at the 2nd leaf stage, while normal plants were resistant to *P. recondita* and susceptible to *P. graminis*. Uredosori of *P. graminis* were much larger on 'albina' than on normal plants.

Haine (M. E.). **The electron microscope. The present state of the art.**—xvi+282 pp., 39 fig., 50 diag., 24 graphs, London, E. & F. F. N. Spon, Ltd., 1961. 55*s*. [91 ref.]

This most useful book on the design and operation of the electron microscope [cf. **39**, 160] contains 10 chapt., the last being written in collaboration with V. E. Cosslett. These deal, respectively, with: optical properties of electron microscope lenses; electron waves, coherence, and wave propagation; theoretical limitations to resolving power; image contrast; factors limiting performance; the electron gun characteristics; observation and recording of electron image; design; related techniques and instruments; and specimen techniques and applications.

Bonnier (C.). **Formation de tumeurs à Agrobacterium tumefaciens sans blessure préalable.** [The formation of tumours by *A. tumefaciens* without preliminary wounding.]—*Bull. Inst. agron. Gembloux*, **28**, 3, pp. 259–265, 3 fig., 1960.

In further studies [cf. **39**, 540] over 1,000 sterile lucerne and *Vicia villosa* plants in glass tubes were treated with a suspension of str. t.6 of *A. tumefaciens* without wounding; 5% of the lucerne and 30% of the *V. villosa* plants developed typical crown gall tumours, morphologically identical with those obtained after wounding, the 1st tumour forming about 30 days after inoculation. Several non-leguminous plants gave similar results. All the plants were maintained at high environmental humidity, which appears to be essential for the formation of tumours without wounding; also experiments must be replicated many times and be of sufficiently long duration. After 3 months tumours were still appearing on leguminous hosts previously unaffected.

Most of the tumours developed either at secondary root axils or at the point of emergence of a secondary stem, where small quantities of wound substances may be formed naturally. In other words there is no such thing as an intact plant.

Soprunov (F. F.) & Tendetnik (Yu. Ya.). Материалы к практическому применению хищных грибов по борьбе с некоторыми геогельминтозами. [Data on the practical use of predacious fungi for the control of some eelworm diseases.]—Труд. гельминт. Лаб. [*Trud. gel'mint. Lab.*], **10**, pp. 192–194, 1960.

The 2 most promising predacious fungi [cf. **39**, 3] from a 5-yr. study of 20 strs. at the Helminthological Lab. were *Arthrobotrys oligospora* and *A. dolioformis* [**37**, 445] and the best culture substrates were chopped maize and oatmeal. After growth and sporulation (15–20 days at 25–30° [C.]) the cultures are milled and dried. Powder with 1–2,000,000 spores/g. is good and costs about roubles 4.50/kg. It can either be sprinkled on the surface or mixed in at 0·1%/wt. of soil or manure. The fungus can be found in the soil for 1 yr., but numbers decrease considerably 3–4 months after sowing. Retention and development in the soil requires relatively high moisture and *ca.* 15–30°, the presence of organic materials, and free O. Successful results in the practical application of such preparations are reported.

Groves (A. B.) (Editor). **Results of 1960 fungicide-nematocide tests.**—84 pp., American Phytopathological Society, 1961. $1.00 from A. B. Groves, Winchester Fruit Res. Lab., Winchester, Va, U.S.A.

This report, presented as before [cf. **39**, 667], includes summaries of results obtained by many research workers in N. and S. America with a wide range of foliage and turf fungicides, antibiotics, bactericides and growth substances, seed and soil fungicides, nematocides, and other substances from 73 firms against many diseases of a wide range of crops.

Plant quarantine announcements.—*F.A.O. Plant Prot. Bull.*, **9**, 1, pp. 12–14, 1960.

Spain. Resolution of the Min. Agric. of 8 Apr. 1960 (*Bol. ofic. Estado*, 20 Apr. 1960) supplements the Order of 14 Mar. 1953 [**33**, 336] by providing that all countries in America, Africa, Asia, Australia, and the Mediterranean Basin shall be considered to harbour citrus tristeza virus and black spot (*Phoma* [*Guignardia*] *citricarpa*) and Pierce's disease of the vine [lucerne dwarf virus].

Viet-Nam. Decree No. 182–BCN–ND–KH–1–A of 13 June 1960 (*Cong-Bao Viet-Nam Cong-Hoa*, **6**, 32, 9 Jul. 1960) establishes measures governing the importation of cacao propagation material.

Moser (M.). **Beiträge zur Kenntnis der Wuchsstoffbeziehungen im Bereich ectotropher Mycorrhizen. I.** [Contributions to the knowledge of the relationship

of growth substances in the field of ectotrophic mycorrhiza. I.]—*Arch. Mikrobiol.*, **34**, 3, pp. 251–269, 1959.

At the Forstl. Bundesversuchsanstalt Mariabrunn, Bodenbiologisches Inst., Imst, Austria, several mycorrhizal fungi (mostly Agaricales) formed indoles, including some growth substances, from tryptophane, and induced typical short root formations such as dichotomous branching [**40**, 497] in tree seedlings. If other N compounds more easily attacked than tryptophane are present the formation of indoles may be suppressed. Mycorrhizal fungi were better able to form growth substances than were fungi of other ecological groups (from straw and wood, and saprophytes). With initial material other than tryptophane in pure culture it was possible only in a few cases on alanine-asparagine+indole to obtain indole substances (as yet unidentified). Some indole substances were obtained in mixed cultures of mycorrhizal and rhizosphere fungi (i.e. *Phlegmacium* [*Cortinarius*] *caesiocanescens*+*Trichoderma viride* or +*Penicillium frequentans*) on anthranilic acid.

Vicente Jordana (R.). **The kinetics of cytoarjesis as determined on a macroscopic scale : host-parasite equilibrium. Cytoarjesis in Potato tubers V. Influence of germinative activity in arresting soft-rot and other infections : effects of tuber inactivation and reactivation.**—*An. Edafol. Agrobiol.*, **19**, 2, pp. 69–111, 34 fig., 2 diag., 7 graphs; 6, pp. 315–363, 14 fig., 2 diag., 8 graphs, 1960. [Span. summ. 66 and 43 ref.]

From the Instituto 'Jaime Ferrán' de Microbiologia C.S.I.C., Madrid, further experimental evidence is presented to elucidate the author's concept of cytoarjesis [**39**, 494], including a mathematical study of the kinetics of the process, a study of the biological activity of growth as responsible for host defence, the influence of physical factors on cytoarjesis, and host-parasite equilibrium.

The 2nd paper reports that potato tubers may be soft-rotted by *Erwinia carotovora* var. *aroideae*, *E. atroseptica*, and *Bacillus polymyxa* if further development of buds is arrested, and that disease development is inhibited by active, growing buds. The extent of soft rot varies inversely with germinative activity.

The effects on soft-rot development were studied on tubers inactivated by temp., poor aeration, immersion in water at different temps., and treated with methyl and ethyl alcohols. Sealing of germinative points with olive oil resulted in inactivation of the tuber and eventual soft rot, but if the surface of tubers was 'sealed' leaving the eyes free, tubers may sprout, with arrest of infection. When the whole tuber is sealed the tuber does not sprout and rots set in. Tubers temporarily inactivated can arrest infection if transferred to conditions allowing recovery of germinative activity.

The effect of water uptake on host-synthesis and host-defence is also considered.

Turner (Elizabeth M. C.). **An enzymic basis for pathogenic specificity in Ophiobolus graminis.**—*J. exp. Bot.*, **12**, 34, pp. 169–175, 2 fig., 1961.

A shorter version has been noticed [**39**, 673].

Arya (H. C.). **On the occurrence of physiological strains in Myrothecium roridum.** —*Indian Phytopath.*, **12** (*1959*), 2, pp. 164–167, [1960].

Isolates of *M. roridum* from *Cyamopsis tetragonoloba* [*C. psoraloides*] (*Indian Phytopath.*, **9**, 2, pp. 174–181, 1956) and 7 other hosts near Jodhpur varied in pathogenicity but were not host-specific. Five types were distinguished on the basis of physiological characters but there were no significant morphological differences.

Brian (P. W.), Dawkins (A. W.), Grove (J. F.), Hemming (H. G.), Lowe (D.), & Norris (G. L. F.). **Phytotoxic compounds produced by Fusarium equiseti.**—*J. exp. Bot.*, **12**, 34, pp. 1–12, 1 fig., 1961.

At Akers Res. Lab., Welwyn, several phytotoxic substances were isolated from culture filtrates of several *F. equiseti* strs.; the most important was a colourless crystalline compound, diacetoxyscirpenol, highly phytotoxic and only slightly inhibitory to fungi and bacteria.

Schmiedeknecht (M.). **Appressorien und Chlamydosporen von Colletotrichum atramentarium (Berk. et Br.) Taub.** [Appressoria and chlamydospores of *C. atramentarium*.]—*Arch. Mikrobiol.*, **34**, 4, pp. 374–378, 4 fig., 1959.

Further studies at Inst. für Phytopathologie, Aschersleben, Germany, showed that *C. atramentarium* [**36**, 784] forms chlamydospores (1st described by Ettig [**38**, 395]) as well as appressoria in culture. The 2 organs are different in genesis and function, shape and size, but the appressoria are often mistakenly described as chlamydospores.

McDonough (M. W.) & Richard (Beryl). **The influence of certain simple nitrogenous compounds on growth and sporulation of Chaetomium globosum.**—*Ann. Bot., Lond.*, N.S., **24**, 96, pp. 475–481, 1960.

In further studies at Imperial Coll., London [**35**, 916], vigorous perithecial formation by *C. globosum* occurred on media containing ammonium pyruvate or lactate, α-alanine, or aspartic acid; perithecial formation was less active with other amino-acids and very weak with ammonium tartrate. Vigour of fruiting appeared to be associated with the presence of organic phosphates in the media.

Kirkhenshteĭn (A. M.) (Editor). Вопросы сельскохозяйственной микробиологии. **IV.** [Problems of agricultural microbiology. IV.]—Труд. Инст. Микробиол., Акад. Наук Лат. ССР [*Trud. Inst. Mikrobiol. Akad. Nauk Lat. S.S.R.*] 11, 168 pp., illus., 1960.

Information, mostly of the numbers of actinomycetes and microscopic fungi in soils, is given in these papers.

Kreslin' (D. Ya.). [The effect of deepening the tillage layer on the development of micro-organisms in turf podzol soils.] (pp. 3–19) and [The effect of liming and peat introduction on the number of micro-organisms in turf podzol soils.] (pp. 21–28).

Klintsare (A. A.). [The effect of azotobacterin and treatments of soil microflora] (pp. 49–69), recording the numbers of actinomycetes and microscopic fungi under summer wheat and oats.

Pavlovicha (Mme D. Ya.). [The relation between *Azotobacter* and other groups of micro-organisms in the plant rhizosphere.] (pp. 129–152), involving actinomycetes, *Pseudomonas* spp., *Penicillium claviforme*, etc.

Domsch (K. H.). **Das Pilzspektrum einer Bodenprobe. I. Nachweis der Homogenität. II. Nachweis physiologischer Merkmale. III. Nachweis der Einzelpilze.** [The fungus spectrum of a soil analysis. I. Demonstration of homogeneity. II. Demonstration of physiological characteristics. III. Demonstration of individual fungi.]—*Arch. Mikrobiol.*, **35**, 2, pp. 181–195, 1 graph; 3, pp. 229–247; 4, pp. 310–339, 23 fig., 1960. [Engl. summ.]

In these further studies [cf. **36**, 59] at the Kiel-Kitzeberg (Schleswig-Holstein) branch of the German Biol. Inst. methods are critically discussed. The numerical data of a 13 times repeated analysis of a soil are given in relative frequency groups, the homogeneity of fungus distribution being considered for dominance and fre-

quency. The spp. are then segregated into groups on the basis of physiology antagonism, and decomposition factors.

When tested against 5 phytopathogenic fungi, 12 spp. (mainly *Penicillium*) had a high antibiotic activity. Fungi with the highest growth rates on artificial and natural substrata were typically the 1st colonizers of new substrata; among them were phycomycetes and cellulose decomposers. Chitin utilization was found predominantly in phycomycetes, all of which gave a cellulose reaction in their walls. *P. albo-aurantium* and *P. lilacinum* also decomposed chitin well. *Chaetomium* spp. were most active cellulose decomposers, as also were *Botrytis cinerea* and *Rhizoctonia* [*Corticium*] *solani*. Good lignin utilization was found, if at all extensive, predominantly in the Sphaeropsidales. Only a few *Fusarium* spp. were able to grow without O, but low requirements were found in some *Aspergillus*, *Penicillium*, and *Phoma* spp.

In addition to the above aspects acid production, saprophytic competitive ability, starch and tannin utilization, and protein decomposition were investigated. The conclusions are discussed in relation to the present conception of the ecology of soil fungi.

In III the salient features are given under each sp. in an alphabetical list.

Lugauskas (A.). **Pašarinių augalų rizosferos mikroskopinių grybų vystymosi priesmėlio, priemolio ir gilaus durpyno dirvose dinamika.** [The dynamics of the development of microscopic fungi in the rhizosphere of fodder plants in sandy loam, clayey, and peat soils.]—*Liet. TSR moks. Akad. Darbai*, Ser. C, *1960*, 3 (23), pp. 27–34, 1960. [Russ. summ.]

At the Inst. Bot., Acad. Sci. Lithuanian S.S.R., Vilnius, the rhizospheres of red clover, red fescue [*Festuca rubra*], and kale in 3 soil types and that of sweet yellow lupin in 2 were studied during the 1959 growing period. Soil suspensions and root washings in sterile water taken at different stages of growth from individual plants were inoculated on an acid agar medium. Rhizosphere fungi were max. at the most intensive period of plant growth. More fungi were detected in sandy loam and peat than in clay soils, and fewer in the rhizosphere of kale than in that of the other plants. The genera most frequently represented were *Penicillium*, *Fusarium*, *Trichoderma*, *Mucor*, *Gliocladium*, and *Alternaria*. Clay soil had the widest species range.

Cuzin (F.). **Apparition régulière chez Curvularia pallescens, d'une variation sectorielle contagieuse, non transmissible par les thallospores.** [Regular appearance in *C. pallescens* of an infective sectorial variation not transmissible by the thallospores.]—*C.R. Acad. Sci., Paris*, **252**, 11, pp. 1656–1658, 1961.

Homokaryotic cultures from conidia presented 2 successive phenotypes, the 2nd being a frequent sectorial variant, stable in massive mycelial transfers. It is able to induce the 'mutation' of a hypha of the original phenotype, when the cytoplasms of the 2 types are in contact [cf. **39**. 558], without nuclear interchange; this phenotypic modification invariably disappears with the production of thallospores.

Mazelaitis (J.). **Kai kurie duomenys Lietuvos TSR aukśliagrybiu (Ascomycetes) florai.** [Some data on the Ascomycete flora of the Lithuanian S.S.R.]—*Liet. TSR moks. Akad. Darbai*, Ser. C, *1960*, 3 (23), pp. 35–39, 1960. [Russ. summ.]

This list from the Inst. Bot., Acad. Sci. Lithuanian S.S.R., Vilnius, of 30 spp. collected in 1950–59 includes *Ustulina vulgaris* on aspen (*Populus tremula*), elm, *Tilia* sp., and ash and *Rhizina inflata* on pine (*Pinus sylvestris*).

Khinkova (Mme T.). Флористични материали и критични бележки върху нашата наразитна гръбна флора. [Floristic data and critical notes on the Bulgarian

parasitic fungus flora.]—*Bull. Inst. bot., Sofia* 7, pp. 333–344, 1960. [Russ., Engl. summ.]

This list comprises 88 parasitic spp. (44 rusts) new to Bulgaria, including *Lophodermium juniperinum* on *Juniperus communis*, *Melampsora amygdalina* on *Salix triandra*, *M. magnusiana* [*M. populnea*] on aspen (*Populus tremula*), *M. ribesii-purpurea* on *S. purpurea*, and *Puccinia poae-sudeticae* on *Poa annua*, and 86 spp. on new hosts.

Annaliev (S. A.). Итоги изучения микофлоры Кара-Калинского района Туркменской ССР. [The results of a study of the mycoflora of the Kara-Kala region of the Turkmen S.S.R.]—Вестн. Москов. Унив. [*Vestn. Moskov. Univ.*], Ser. biol., **15**, 5, pp. 42–47, 1960.

Studies in 1958-9 and published data disclosed 551 spp. and forms including over 70% parasitic fungi. The author collected 500 spp. and forms, of which about 200 were new records for Turkmenistan. Most of the fungi parasitized agricultural plants or useful wild ones. Some new specific names are listed [without descriptions].

Swenson (K. G.) & Carpenter (G. P.). **Transmission of the ringspot virus of stone fruits from Squash to Squash by foliage contact.**—*Phytopathology*, **51**, 1, pp. 68–69, 1961.

At the Dept Entomol., Ore. State Coll., and the U.S. Dept Agric. 12 of 48 healthy Buttercup squash plants grown in separate containers in the greenhouse became infected with [peach] ring spot virus [**38**, 756] by foliage contact with diseased plants. Root contact had no such effect.

This is an unexpected property of the virus since mechanical inoculation requires considerable care and its yield from diseased cucurbits is low compared with that of tobacco mosaic virus and potato virus X, also transmitted by foliage contact.

Das (C. R), Milbrath (J. S.), & Swenson (K. G.). **Seed and pollen transmission of Prunus ringspot virus in Buttercup Squash.**—Abs. in *Phytopathology*, **51**, 1, p. 64, 1961.

Greenhouse and field experiments indicated that seed transmission of *Prunus* [peach] ring spot virus [see above] in Buttercup squash depends on the presence of the virus in the ovary rather than in the pollen, though healthy plants became infected when pollinated with diseased pollen.

Slykhuis (J. T.). **Current status of mite-transmitted plant viruses.**—*Proc. ent. Soc. Ontario*, **90** (*1959*), pp. 22–30, 1960. [*Biol. Abstr.*, **36**, 1, p. 223, 1961.]

Of the 6 plant viruses transmitted by eriophyid mites wheat streak mosaic [**40**, 352] and rye grass [*Lolium*] mosaic [**40**, 311] are also readily transmitted manually. Outbreaks of wheat streak mosaic and wheat spot mosaic [**36**, 389], both transmitted by *Aceria tulipae*, result from overlapping sequences of immature wheat. Control depends on eliminating the diseased, immature wheat before sowing new crops near by. Currant reversion [black currant reversion virus: cf. **36**, 654] is spread slowly by *Phytoptus ribis* and can be checked by roguing and spraying. Effective control of fig mosaic, peach mosaic, and rye grass mosaic viruses, transmitted by *A. ficus*, *Eriophyes insidiosus*, and *Abacarus hystrix*, respectively, has not yet been obtained.

Jha (A.) & Posnette (A. F.). **Transmission of Arabis mosaic virus by the nematode Xiphinema diversicaudatum (Micol.).**—*Virology*, **13**, 1, pp. 119–123, 1961.

In further studies at East Malling [cf. **39**, 427] 30% of *X. diversicaudatum* reared on strawberry roots transmitted arabis mosaic virus [**40**, 214] to *Petunia hybrida*

seedlings; batches of 10 caused 90% infection. The min. test-feeding period was 3 days; longer ensured higher percentage infection. Non-infective nematodes acquired the virus in 24 hr. and were still infective after fasting for 30 days in autoclaved sand.

Terekhova (Mme N. A.). Об условиях выздоровления Абутилона от инфекционного хлороза. Сообщение I. О влиянии света. [On the conditions for the recovery of *Abutilon* from infectious chlorosis. Report I. On the effect of light.]—Воп. Вирусол. [*Vop. Virusol.*], **4**, 6, pp. 724–727, 1959. [Engl. summ.]

At Inst. Microbiol., Acad. Sci., Moscow, scions from *Abutilon striatum* infected by infectious chlorosis [infectious variegation] virus [**7**, 385; **39**, 466] were grafted to healthy *A. pictum* plants, and the spotted scions on each plant carefully masked by thick black paper immediately after inoculation. Darkening did not produce 'fixation' or inactivation of the virus. Infection of healthy stocks through virus-infected scions may occur in the dark. Not all the buds on infected plants contained the virus; young leaves and buds can become infected only if there are infected leaves on the plant. When diseased plants, therefore, are kept for a long time in the dark and the old spotted leaves are shed, healthy buds may develop. The persistent removal of old leaves on an infected plant should lead to the production of healthy buds.

Ross (H.). **Die Züchtung auf Virusresistenz bei Pflanzen.** [Breeding for virus resistance in plants.]—*Ber. dtsch. bot. Ges.*, **74**, 1, pp. 23–25, 2 fig., 2 graphs, 1961.

In this lecture delivered at the Botaniker-Tagung, Cologne, the author states that the most unfavourable of the 4 types of resistance to virus diseases [cf. **38**, 537] is tolerance. In the absence of more effective resistance beet has been bred for tolerance of yellows virus and cucumber for tolerance of mosaic virus.

While infection resistance [**38**, 71], so far as is known, is effective against all strs. of potato leaf roll virus, in some tomato vars. infected by bronze leaf virus [? tomato spotted wilt str.] this type of resistance depends on the virus str.

Hypersensitivity is effective in *Nicotiana glutinosa* against tobacco mosaic virus and is inherited as a dominant monomer; so far it has inhibited infection by all strs. of TMV, including the nitrite mutants. As the genome of *N. glutinosa* is not homologous with the tobacco genome, and the addition hybrids as well as the substitution hybrids are qualitatively insufficient, exchange hybrids had to be bred.

In dwarf bean [*Phaseolus vulgaris*] a monomerically dominant gene for hypersensitivity to mosaic 1 [bean common mosaic virus] also occurs, but its action is not strong enough to prevent systemic infection at higher temp.

In addition to the gene for extreme resistance to potato viruses Y and A in *Solanum stoloniferum* there are 2 genes for hypersensitivity which may be allelic to it. In *S. acaule*, too, in addition to the gene for extreme resistance to potato virus X 2 genes for hypersensitivity occur. All genes for extreme resistance and hypersensitivity in *S. stoloniferum* and *S. acaule* are fully active, i.e. they do not depend on the str. The gene for extreme resistance to virus X has already been transferred from *S. acaule* to a back-cross hybrid, which has been recognized as a var. The same can be expected of the gene for extreme resistance to viruses Y and A in the near future.

Wilkinson (J.). **Virus-induced abnormalities of mitosis in certain solanaceous species.**—*Ann. Bot., Lond.*, N.S., **24**, 96, pp. 516–521, 1960. [15 ref.]

At Univ. Exeter mitotic abnormalities were found in solanaceous spp. inoculated with tomato aspermy virus [**32**, 457] or tobacco aucuba mosaic virus [tobacco mosaic virus str.]. They ranged from persistence of the nucleolar structures to early

anaphase to complete amitosis in stem-enations on *Petunia violacea*. The evidence appears to support the view that multiplying virus particles compete with the nuclear DNA for RNA in the nucleolus of dividing cells.

Dijkstra (J.) & Grancini (P.). **Serological and electron microscopical investigations of the relationship between Sorghum red stripe virus and Sugar Cane mosaic virus.**—*Tijdschr. PlZiekt.*, **66**, 5, pp. 295–303, 1 pl., 1 graph, 1960. [Dutch summ.]

By means of the microprecipitation test [**35**, 480] a qualitative relationship was established at Wageningen between sorghum red stripe virus from *Sorghum halepense* from Italy [**37**, 651] and from inoculated maize and sugarcane mosaic virus from Puerto Rico. There was no difference in particle length between the 2 viruses [cf. **38**, 768; **39**, 161].

Badami (R. S.). **Sero-diagnostic methods for phytopathological studies.**—*J. Indian bot. Soc.*, **39**, 4, pp. 503–530, 1960. [85 ref.]

The author (Univ. Bot. Lab., Madras) attempts to acquaint Indian plant pathologists with the many uses of serology [cf. **40**, 158], especially in diagnosis and classification of plant viruses. He lists and describes types of serological methods, their application in 5 types of tests, serological methods for quantitative plant virus and fungus studies, briefly discusses the problems involved, particularly the failure to apply methods for all plant viruses, and gives a table of 17 viruses grouped by serological relations.

Thresh (J. M.). **Cacao virus research in Nigeria.**—*Turrialba*, **10**, 2, pp. 57–63, 4 fig., 1960.

A review [cf. **40**, 33 (Thresh); **40**, 94].

Dijkstra (J.) & Grancini (P.). **Electron microscopical investigations of mosaic diseased Wheat plants found in Italy.**—*Tijdschr. PlZiekt.*, **66**, 5, pp. 301–304, 1 pl., 1 graph, 1960. [Dutch summ.]

In preparations of diseased wheat leaves from Brescia, obtained at Wageningen by the 'dipping method' of Brandes [**37**, 244], there were rod-shaped virus particles 300 mμ long, which were absent from healthy plants. The virus has not yet been transmitted mechanically.

Nakagawa (M.), Soga (Y.), Okazima (N.), Yoshioda (A.), & Nisimata (D.). **Genetic studies on Wheat mosaic virus. I. Genes affecting the inheritance of susceptibility to strains of green mosaic virus in the varietal crosses of Wheat.**—*Jap. J. Breed.*, **8**, 3, pp. 169–170, 1958. [Jap. with Engl. summ. *Biol. Abstr.*, **36**, 1, p. 7, 1961.]

At Tokai-Kinki Agric. Exp. Sta., Japan, results of factor analysis of susceptibility in F_2 generation plants suggested that 3 genes determine the occurrence of wheat green mosaic virus [soil-borne wheat mosaic virus (str.): cf. **16**, 665]; 2 susceptibility genes (H and M) [**39**, 563] and 1 modifying (A), which specifically inhibits the H gene, appear to be involved; vars. having the H gene are the most susceptible.

Agarkov (V. A.). О вирусном заболевании озимой Пшеницы. [On a virus disease of winter Wheat.]—(Труд.) всес. н.-и. Инст. сахарн. Свеклы [(*Trud.*) *vses. n.-i. Inst. sakharn. Sveklȳ*, *1959*, 34, pp. 303–305, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 20, p. 171, 1960.]

The spread of a new form of mosaic of winter wheat is reported from several regions of the Pravoberezh'e, Ukrainian S.S.R. Control measures are recommended.

Hassebrauk (K.). **Der Getreiderost — ein auch heute noch nicht bewältigtes Problem der Landwirtschaft.** [Cereal rust—a problem of agriculture that still remains unconquered to-day.]—*Umschau*, **60**, 14, pp. 436–438, 5 fig., 1960.

Recent developments in the knowledge of *Puccinia* spp. and fresh complications in their control are discussed under the headings: emergence of new races and their propagation; migration of epiphytotics into regions hitherto unaffected [**40**, 35]; and difficulties of combating the pathogens and breeding for resistance.

Watanabe (Y.), Mukade (K.), & Kokobun (K.). **Studies on the production of amphidiploids as the sources of resistance to leaf-rust in Wheats. IV. Cytogenetical studies on the F_1 hybrid and the amphidiploids, Triticum timopheevi Zhuk. × Aegilops comosa Sibth. et Sm.**—*Jap. J. Breed.*, **7**, 3, pp. 169–174, illus., 1958. [Jap. with Engl. summ. *Biol. Abstr.*, **36**, 1, p. 8, 1961.]

Colchicine was used at Tôhoku Agric. Exp. Sta., Japan, to synthesize 6×amphidiploids from artificial hybrids of *T. timopheevi*×*A. comosa* in an attempt to produce a single hybrid var. with superior rust resistance. A description of 1 amphidiploid states that its grains are large and closely adherent to the glumes and that it is immune from many races of *Puccinia triticina* [*P. recondita*]. It is completely incompatible with *A. comosa* but can be easily crossed with *T. timopheevi* and various strs. of the *vulgare* group and with other spp. in the Triticinae group.

Lin (K-M.) & Tseng (C-J.). **Preliminary report on Wheat breeding for rust resistance in Taiwan.**—*Bot. Bull. Acad. sinica*, **1**, 2, pp. 157–163, 1960. [Chin. summ.]

Rust epidemics (*Puccinia rubigo-vera tritici* [*P. recondita*] and *P. graminis*) [**37**, 226] were induced by planting in a special locality (Taichung) where outbreaks were most frequent and by late sowing, heavy fertilizer application, and frequent irrigation. Great differences in resistance to leaf and stem rust were found among the 346 wheat vars. introduced from U.S.A. and other countries. Timstein×Newthatch, relatively early, was crossed with leading local vars. Taichung No. 31 and No. 32. Four new homozygous strs. proved highly resistant to both rusts in 5 localities in the Taichung area and were higher yielding. Resistance to leaf rust is governed by a single pair of dominant genes and to stem rust by a single pair of recessive genes.

Shopina (Mme V. V.). К оценке поражаемости сортов Пшеницы расами бурой ржавчины. [On assessing susceptibility of Wheat varieties to races of brown rust.]—*Sel. Seed-Gr., Moscow*, **25**, 6, pp. 64–65, 1960.

To determine the degree of resistance to races of brown rust [*Puccinia recondita*: cf. **40**, 95] of 32 promising zoned wheat vars., mildly susceptible in field counts, plants were inoculated at the All-Union Inst. Plant Protect. in the sprout stage with the most aggressive and most widespread races in the Soviet Union (77, 80, and 99). Assessment was by the Jackson and Mains' scale [**5**, 477]. Only 1 var., Narodnaya, was really resistant to the 3 races; Gordeiforme 10 and Dika 9/14 were mildly susceptible. A collection is being made at the Inst. of races of *P. recondita* occurring in the Soviet Union. The vacuum method is recommended for storage.

Bošković (M.). **Štetnost lisne rđe (Puccinia rubigo-vera tritici) na Pšenici u 1958 godini.** [The severity of leaf rust of Wheat (*P. recondita*) in 1958.]—*Savr. Poljopr.*, **7**, 4, pp. 287–293, 1959. [Engl. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 20, p. 172, 1960.]

The results of work in other countries on the factors influencing the yield of wheat infected by *P. recondita* [**39**, 565] are presented, including those from the sci. Res. agric. Inst., Novi Sad, Yugoslavia, in 1958. Losses from *P. recondita* and in part from *Erysiphe graminis* f. *tritici* were assessed at 20–28%, in spite of the fact that

infection occurred at the milk stage. *P. recondita* can cause serious damage when wheat development continues for a long time in arid conditions.

Sears (E. R.), Schaller (C. W.), & Briggs (F. N.). **Identification of the chromosome carrying the Martin gene for resistance of Wheat to bunt.**—*Canad. J. Genet. Cytol.*, **2**, 3, pp. 262–267, 1960. [*Biol. Abstr.*, **36**, 1, p. 5, 1961.]

Monosomic methods were used at Univ. Calif., Davis, to test each of the 21 chromosomes of White Federation 38 wheat for the Martin gene [cf. **40**, 39], responsible for resistance to *Tilletia caries*. It was located on chromosome XIII.

Tsŷmbal (M. M.) & Chŷzh (V. A.). Вивчення дії гамма-проміння радіоактивного ізотопу кобальту проти твердої сажки озимої Пшениці. [The use of the gamma-radiation of a radioactive cobalt isotope against bunt of winter Wheat.]—Вісн. сіл.-гос. Науки Укр. Акад. сіл-гос. Наук [*Visn. sil.-hos. Naukŷ Ukr. Akad. sil.-hos. Nauk*], *1960*, 2, pp. 83–85, 1960. [Russ. summ. Abs. in *Referat. Zh. Biol.*, *1960*, 20, p. 171, 1960.]

Seed of Odesskaya 3 winter wheat was irradiated for 10–30 days with γ-rays (Co^{60}) at the All-Union sci. Res. Inst. for Maize at 12–13% seed humidity, using a KC–2A–50 type apparatus without filter at a distance of 50 cm. from the radiation source at a power of 84 r./hr. The doses were 1,200–20,000 r. Irradiated seed was sown on 3 and 30 Sept. The former showed no bunt [*Tilletia caries*: cf. **39**, 698] but with the latter irradiation reduced infection 2-fold with doses of 1,500–2,000 r., and 7-fold with doses of 20,000 r.

Takegami (S.). **Varietal difference in the rate of symptom expression of head blight (Gibberella zeae (Schw.) Petch.) in Wheat spikes.**—*Proc. Crop Sci. Soc., Japan*, **29**, 2, pp. 245–248, 1 fig., 1961. [Jap. Abs. from Engl. summ.]

In further field tests at the Fac. Agric., Okayama Univ. [cf. **38**, 509], spikes bearing 1–2 flowers infected by *G. zeae* [**40**, 218] were selected from 12 wheat vars. (both susceptible and resistant). In a fixed period the rate of symptom expression in susceptible was more rapid than in resistant vars. The differences in this varietal character are closely connected with the variation in resistance to *G. zeae*.

Rod (J.). **Geneticko-fyziologická studie rezistence Pšenic proti sněti prašné. V. Vyhlídky šlechtění na rezistenci. VI. Úloha umělých infekcí ve šlechtění.** [Genetico-physiological study of the resistance of Wheats to loose smut. V. Prospects of breeding for resistance. VI. The role of artificial infection in breeding.]—*Ann. Acad. tchécosl. Agric.*, **33**, 10, pp. 1347–1362; 12, pp. 1589–1608, 1 diag., 6 graphs, 1960. [Russ., Germ. summ. 56; 36 ref.]

In a 5-yr. study on *Ustilago tritici* [*U. nuda*: cf. **39**, 688] by Fodder Res. Inst., Pohořelice, Czechoslovakia, the susceptible summer wheat Niva was crossed with the resistant Peragis, back-crossing and selection being repeated 4 times. The progeny yielded essentially the same as Niva and were highly resistant, except in 1957 when Peragis also was slightly infected.

The 2nd paper analyses the results of spore inoculation of healthy and partially infected plants of Niva (13 lines) and Alpiner begrannter braunspelziger Binkel (4). The degree of resistance was not correlated with incidence of infection in previous generations, but depended on the line. Experimental inoculation, unable itself to influence hereditary composition of the breeding material, is useful as a means of selection.

Bondar (S. A.). Обеззараживание Пшеницы и Ячменя от пыльной головни сухим способом. [Dry disinfection of Wheat and Barley from loose smut.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 2, pp. 24–25, 1961.

At Vinnitsa regional exp. Sta., Nemerchi, U.S.S.R., summer wheat seed soaked in

cold water was freed entirely from loose smut [*Ustilago nuda*: cf. **39**, 298, 688] by hot air treatment (at 50° [C.] for 6 hr., 55 for 4, 60 for 1·5, or 65 for 1). Similar results were achieved with Umanskiĭ barley (at 55° for 3 hr. or 60 for 1·5). The superiority of hot air to hot water or granosan was confirmed by tests on Lutescens 17 wheat seed inoculated with bunt [*Tilletia*] spores.

Kuznetsov (L. V.). Меры против головни. [Control of smut.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 2, pp. 22–24, 1961. [31 ref.]

An annotated survey of Soviet and other literature for 1951–59 on loose smut of wheat and barley (*Ustilago nuda*).

Popa (E.). **Contribuții la studiul morfologic și biologic al ciupercii Tilletia pančičii Bub. et Ranoj., care produce mălura Orzului.** [Contributions to morphological and biological studies of *T. pancicii* producing bunt on Barley.] *Comun. Bot., Bucureşti, 1957–1959*, pp. 269–280, 2 fig., 1960. [Russ., Fr. summ. 21 ref.]

Studies of *T. pancicii* [cf. **38**, 78] from 6 localities of the Craiova region, Romania, yielded the following data: spherical chlamydospores 18–21 μ diam. (ellipsoidal and oval 20–26 × 18–24), reticulate on surface to form 35–70 polygonal alveoli 2–6 μ long, separated by ridges 1·5–3 μ high; epispore pale brown violet; opt. temp. for germination (after at least 4 weeks) 5–7° C. Attempts to infect barley in the greenhouse through soil or seed were unsuccessful.

Hiura (U.). **Studies on the disease-resistance in Barley. IV. Genetics of the resistance to powdery mildew.** *Ber. Ōhara Inst.*, **11**, 3, pp. 235–300, 1 pl., 1 fig., 1960. [59 ref.]

In further studies [cf. **35**, 176] 17 genes for resistance to mildew (*Erysiphe graminis*) were identified in 146 barley vars.; 7 were allelic to one another and 4 were linked with these, while the remaining 6 were independent. Of the 8 genes present in vars. with resistance to the American race 3, only 4 were connected with resistance to this race [cf. **40**, 356]. It is emphasized that the effective gene for resistance detected is dependent on the race of mildew used as inoculum. A list is given of resistant vars.

Roth (G.). **Über antibiotische Wirkungen von drei Pseudomonasarten auf Wachstum und Mycelbildung von samenbegleitenden Pilzen sowie Bacillus cereus var. mycoides.** [On the antibiotic action of three *Pseudomonas* spp. on the growth and mycelium development of seed-borne fungi and *B.c.* var. *mycoides*.] —*Arch. Mikrobiol.*, **33**, 4, pp. 378–386, 7 fig., 1959.

Further work at the Inst. für Pflanzenschutz, Hohenheim, Germany [cf. **38**, 363], showed that 'healthy' barley seed contains bacteria with an antibiotic action against most fungi (*Gibberella zeae*, *Fusarium equiseti*, *F. oxysporum*, *Aspergillus amstelodami*, *Penicillium* sp., *Phyllosticta* sp., *Cladosporium herbarum*, *Epicoccum nigrum*, and *Trichothecium roseum*) present on the seed. With most a total and a continuous inhibition zone was secured. *Pseudomonas* str. 30 was distinctly more inhibitory than strs. 2 and 37, in that order.

Săvulescu (Alice), Manolache (C.), & Zahariadi (C.). **Bolile, dăunătorii și buruienile din culturile de Porumb și combaterea lor.** [Diseases, pests, and weeds of Maize crops and their control.] *Îndr. teh.*, *1959*, 78, 174 pp., 41 fig., 2 graphs, 1 map, 1959. [44 ref.]

The section on diseases (pp. 5–73), by A. Săvulescu, describes 12 in detail, the causal organism, world distribution, extent and damage, methods of control, and resistant vars. There is also a section on seed treatment.

De Preter (E.) & Vanderweyen (A.). **Les maladies du Maïs dans le Sud du Congo. Incidence et méthodes de lutte.** [Maize diseases in the southern Congo. Incidence and methods of control.]—*Bull. Inform. Inst. Étud. agron. Congo belge*, **9**, 4, pp. 239–267, 7 fig. (6 col.), 3 maps, 1960.

Notes are given on the symptoms, local geographical distribution, and relative importance of *Helminthosporium maydis* [*Cochliobolus heterostrophus*: **37**, 514], *H. turcicum* [**38**, 382], *Puccinia polysora* [**37**, 514], *Sclerospora maydis* [**34**, 583], *Physoderma zeae-maydis* [*P. maydis*: **25**, 154], *Diplodia zeae* [*D. maydis*: **33**, 143], *Fusarium moniliforme* [*Gibberella fujikuroi*], and *Fractilinea maydis* [maize streak virus: **27**, 376]. Observations to assess the losses from these diseases are briefly described and the results tabulated. The paper concludes with a sect. on control by improved cultural methods, seed treatment, and the development of resistant vars.

Palti (J.). **Maḥalat ha-paṣim ba-Tiraṣ.** [Helminthosporium blight of Maize.]—*Hassadeh*, **40**, 11, pp. 1294–1295, 1960. [Heb. From author's summ.]

Maize leaves are affected by *Helminthosporium turcicum* [**38**, 353], stalks rarely, and seed not at all. The disease does not usually appear in Israel before July, when 2-month-old maize in the humid coastal plain may be affected, but spreads to adjacent districts in Aug., when 3–5-week-old crops are also affected. It is found everywhere in Israel in Sept.–Oct. Economic losses are restricted to plots affected within the 1st 6 weeks of growth.

Popescu (I. V.). **Cercetări asupra acțiunii fitoncidelor elaborate de unele plante superioare.** [Investigations on the action of phytoncides produced by some higher plants.]—*Comun. Bot., București, 1957–1959*, pp. 253–257, 1960. [Russ., Engl. summ.]

Maize seed inoculated with chlamydospores of *Sorosporium holci-sorghi* [*Sphacelotheca reiliana*: **37**, 515; **40**, 44] was treated for 30 min. with crushed tissues or sap of *Capsicum annuum*, onion, horse-radish, and radish. Sown in the field where the disease had previously occurred, or cultured in the lab., it yielded crops with considerably reduced infection.

Rédulesku (É.). Эффективность некоторых фунгицидов против пыльной головни Кукурузы. [Effectiveness of some fungicides against loose smut of Maize.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 2, pp. 43–44, 1961.

In tests over 4 yr. by Cluj agron. Inst., Romania, of 30 disinfectants, maize seed inoculated with *Sorosporium holci-sorghi* [*Sphacelotheca reiliana*: **40**, 345] spores at 3 g./kg. was treated effectively by agrosan, abavit-gamma, mereuran, mergamma, dinamal', prosat M, gramisan, abavit novyĭ, NIUIF-2, and red ceresan, all of which gave good control without appreciably affecting germination. Thiram, tillesan, and geksadin reduced infection in field-grown maize but had little effect on spore development in the lab.

Segeťa (V.) & Staněk (M.). **Chladuvzdornosť Kukuřice a patogenní mikroflóra.** [Resistance to cold in Maize and the pathogenic microflora.]—*Ann. Acad. tchécosl. Agric.*, **33**, 12, pp. 1639–1656, 1960. [Russ., Germ., Engl. summ. 41 ref.]

At the Res. Inst. Plant Production, Ruzyně, a *Rhizoctonia* [*Corticium*] *solani* isolate from infected maize introduced into soil hampered the germination and emergence of maize if the soil temp. was below 10° C. In the vicinity of maize seed sown in cold as compared to warmer soil fungi gradually increased [cf. **40**, 103] and bacteria decreased in number. Preliminary seed treatment with agronal reduced the amount of fungi and within a few days caused a rapid increase of bacteria, which were prob-

ably antagonistic to the fungi as the effect of the chemical lessened. The use of agronal or thiram at 0·3 kg./100 kg. seed, alone or combined with lindane, is recommended. Data on the resistance of maize seed to cold in the lab. were correlated with those obtained in the field.

Franco (E.). **Ocorrência de Curvularia maculans no Milho em Sergipe.** [The occurrence of *C. maculans* on Maize in Sergipe.]—*Rev. Agric. Piracicaba*, **35**, 4, pp. 265–268, 1960. [Engl. summ.]

The most important disease on all maize vars. throughout the State of Sergipe, Brazil, is caused by *C. maculans* [cf. **36**, 21].

Whitney (N. J.) & Mortimore (C. G.). **Effect of 6-methoxybenzoxazolinone on the growth of Xanthomonas stewartii (Erw. Smith) Dowson and its presence in Sweet Corn (Zea mays var. saccharata Bailey).**—*Nature, Lond.*, **189**, 4764, pp. 596–597, 1961.

In further studies at the Canada Dept Agric. Res. Sta., Harrow, Ont. [cf. **38**, 366], growth of *X. stewartii* was inhibited by 0·15 mg./ml. MBOA and the pathogen killed by 0·6 mg./ml. Growth was also significantly inhibited by an ether extract from roots and stalks of 2 sweet corn hybrids, shown to contain MBOA. It is suggested that this compound is involved in resistance to bacterial wilt.

Overwater (C.). **Tien jaren Prins Bernhard polder, 1950–1960.** [The ten-years-old Prins Bernhard polder, 1950–1960.] *Surinaam. Landb.*, **8**, 5, pp. 159–218, 9 fig., 1 diag., 21 map, 1 plan, 1960. [Engl. summ. (2 pp.)]

In a sect. on diseases (p. 206) it is noted that in 1953–4 *Cercospora* [*oryzae*: map 71] caused over 40% losses in Rexora padi which was therefore discarded and replaced by Dima and other vars. *Helminthosporium* [*Cochliobolus miyabeanus*] and *Piricularia oryzae* [map 51] may also cause serious damage in susceptible vars. The 'hoja blanca' virus disease was found in 1958 [**39**, 537], especially on long grain rice.

De Mello (Regina E. T.). **Observações sôbre a brusone do Arroz e seu contrôle.** [Remarks on Rice brusone and its control.]—*Biológico*, **26**, 11, pp. 218–222, 1 fig., 1960.

An account of rice scorch (*Piricularia oryzae*) as observed at São Paulo, Brazil [cf. **30**, 538], where it is favoured by high humidity, 22–29° C., and especially by an excess of N. Treatment of seeds with granosan M gave the best control.

Templeton (G. E.), Johnston (T. H.), & Henry (S. E.). **Downy mildew of Rice in Arkansas.**—*Plant Dis. Reptr*, **45**, 2, p. 95, 2 fig., 1961.

The occurrence of *Sclerophthora* [*Sclerospora*] *macrospora* [cf. **39**, 564] on a single infected rice panicle in Stuttgart, Ark., apparently constitutes a new host record for the W. Hemisphere.

Templeton (G. E.), Johnson (T. H.), & Henry (S. E.). **Kernel smut of Rice.**—*Ark. Fm Res.*, **9**, 6, p. 10, 3 fig., 1960.

Kernel smut (*Tilletia* [*Neovossia*] *barclayana*) has been reported annually in Ark. since 1926 but has recently increased in severity, sometimes causing considerable losses in yield. The highest incidence is in fields recently dressed with N, and on the long grain vars. rather than short or medium grain. The pathogen can overwinter for several years in the soil or in infected kernels. Spores germinate best about 7 days after release, at 80° F. Seed treatment is ineffective against this smut, which infects the opening flowers but not the seedlings.

Ikegami (H.). **Studies on the false smut of Rice, IV. Infection of the false smut due to inoculation with chlamydospores and ascospores at the booting stage of Rice plants.**—*Res. Bull. Fac. Agric. Gifu Univ.* 12, pp. 45–51, 1960. [Jap. summ.]

In further studies [cf. **39**, 702] natural infection by *Ustilaginoidea virens* is considered to be caused primarily by ascospores and secondarily by chlamydospores. Since few of the smut balls bear sclerotia it would appear that chlamydospores from the smut balls act as an important source of inoculum. As a result of inoculations it was concluded that infection occurred just before heading.

Hasioka (Y.) & Makino (M.). **Phytopharmacological studies on the Rice diseases, VII. Tolerance of sclerotia of Rice sheath spot fungus, Corticium sasakii, to organomercurials and organoarsenicals.** –*Res. Bull. Fac. Agric. Gifu Univ.* 12, pp. 36–44, 2 graphs, 1960. [Jap. summ.]

In further work [cf. **39**, 702] low concs. (1–5 p.p.m.) of the test fungicides were applied in the irrigation water. Sclerotia of *C. sasakii* [**37**, 719] were killed by 10 p.p.m. methylarsinesulphide but this conc. was phytotoxic. Primary infection was appreciably reduced by the non-toxic conc. of 3 p.p.m. The organo-arsenicals were less phytotoxic than organo-mercurials applied in this manner, though the latter were more fungitoxic. Alkylarsines were more toxic to naturally occurring sclerotia than to those in culture. In general the organo-arsenicals were preferred to Cu or Hg compounds and the most suitable were methylarsinesulphide and methylarsine bisdimethyl-dithiocarbamate.

Rangaswami (G.) & Vasantharajan (V. N.). **Studies on the rhizosphere microflora of Citrus plants as influenced by streptomycin spray.**—*Curr. Sci.*, **30**, 1, pp. 25–26, 1961.

At Annamalai Univ., Annamalainagar, S. India, assay of lime plants given a streptomycin spray [cf. **38**, 743] showed that the antibiotic did not penetrate root tissues. A suspension from root samples was shaken thoroughly and the microbial population assayed by the dilution plate method. The rhizosphere of growing roots was 150 times more densely populated than the surrounding soil, bacteria being 70–150 times denser, actinomycetes 4–20 times, and fungi 4–19 times, but the spray did not change the total population.

Eckert (J. W.), Kolbezen (M. J.), Bretschneider (Brigitte F.), & Nicholas (H. K.). **Controlling Penicillium decay of Oranges with certain aliphatic amines.**—Abs. in *Phytopathology*, **51**, 1, p. 64, 1961.

In tests of 35 aliphatic amines against *P. digitatum* on inoculated oranges the best results, combined with min. fruit injury, were given by secondary butylamine, isopropylamine, di-isopropylamine, diethylamine, and *t*-butylamine at 1 g./$\frac{1}{4}$ cu. ft. carton.

Moreau (C.) & Moreau (Mireille). **Pourritures brunes des Agrumes en entrepôts liées à l'état sanitaire des plantations.** [Brown rots of Citrus in storage related to the sanitary condition of the plantations.]—*Fruits d'outre-mer*, **15**, 11, pp. 478–480, 5 fig., 1960.

Of 5,639 oranges picked in Morocco (in an area with a very damp climate) on 8 June 1960 and examined at the Muséum National d'Histoire Naturelle, Paris, on 22 June, 482 (8·5%) were diseased. Most of the colonies of *Penicillium italicum* and *P. digitatum* masked primary attacks by brown rot, mostly of the peduncle, due to *Phytophthora parasitica*, isolated from 40% of the lesions. Of other fungi identified *Alternaria citri* caused internal rot; numerous others caused superficial rots. A few days later the losses would have been very heavy.

Of 4,084 lemon fruits picked on 20 June in the same locality, arriving in Paris on 1 July, and examined on 8 Aug. after storage at 12° [C.], 1,478 (26%) were diseased. Many were infected by *Penicillium italicum* and *P. digitatum*, masking primary infection by *Diaporthe citri* [map 126], isolated from the pith and the vascular zone. Numerous other fungi were isolated from the fruit surface. Both consignments were attacked by pathogens which had begun infection in the orchard. *D. citri* is a weak parasite, but as dangerous to citrus fruits as is *Phytophthora parasitica*. Its appearance in certain Moroccan orchards may have serious effects on the keeping qualities of the fruit.

Ananth (K. C.) & Chokkanna (N. G.). **A contribution to the knowledge of spore dispersal of Hemileia vastatrix by certain species of thrips occurring in Coffea arabica in South India.**—*Indian Coffee* (*Mon. Bull. Indian Coffee Bd*), **25**, 1, pp. 37–38, 1 pl., 1961.

In Mysore State the authors found *Euphysothrips subramanii* and *Scirtothrips bispinosus* feeding on and dispersing uredospores of *H. vastatrix* on to the underside of coffee leaves carrying a uniform dew deposit. The resultant very early infection of the leaves rendered control during the post-Sept. period impossible.

Mirpulatov (K. I.) (Editor). Защита Хлопчатника, Люцерны и Кукурузы от болезней, вредителей и сорняков. [The protection of Cotton, Lucerne, and Maize from diseases, pests, and weeds.]—194 pp., Tashkent, Gosizdat Uz.S.S.R., 1959. Roubles 10.65.

The results of research during 1955–6 at the Plant Protect. Sta., Sci. Res. Cotton Inst., are gathered together.

Shver (E. V.), Flyagina (Mme A. V.), & Anisimova (Mme V. A.). [The development of combined preparations for centralized treatment of Cotton seed against gummosis, root rot, and cutworm pests] (pp. 7–20). Preparations based on 20% Cu trichlorophenolate (6–7 kg./ton seed) with a variable gamma-BHC content (40 kg. ton seed) allowed scarcely any gummosis [*Xanthomonas malvacearum*: **39**, 25] as against 9·6–18·8% from untreated seed.

Solov'eva (Mme A. I.). [Results of testing samples of the world Cotton collection for resistance to *Verticillium* wilt] (pp. 142–161). *Gossypium hirsutum*×*G. barbadense* hybrids, highly resistant to wilt [*Verticillium dahliae*: **39**, 580], gave highly resistant progeny, with a few exceptions, from *G. barbadense* 2525 which is highly susceptible to the 'new' *V. dahliae* population.

Kublanovskaya (Mme G. M.). [Studies on the biological method of control of *Verticillium* wilt of Cotton] (pp. 162–170). The least successful treatments with actinomycetes against *V. dahliae* [**38**, 5, 747] gave 11–12% reduction in losses.

Menlikiev (M. Ya.). Новые комбинированные протравители семян. [New combined seed treatments.]—Сел. Хоз. Таджикистана [*Sel. Khoz. Tadzhikistana*], *1960*, 2, pp. 13–14, 1960. [Abs. in *Referat. Zh. Biol.*, *1960*, 20, p. 175, 1960.]

Combined dry treatments against the complex of diseases and pests attacking cotton shoots were tested at the Wakhsh Cotton-Lucerne exp. Sta., Tadzhik S.S.R. Seed treatment with preparations based on 20% Cu trichlorophenolate sharply reduced [unspecified] root rot, macrosporiosis [*Alternaria* sp.], and gummosis [*Xanthomonas malvacearum*: **39**, 654 and above].

Christidis (B. G.). **Cotton seed treatment with insecticides and fungicides.**—Ex 'Probleme actuale de Biologie şi Ştiinţe agricole.' Lucrare dedicată Acad. Prof. G. Ionescu-Şişeşti cu prilejul împlinirii a 75 de ani, Bucharest, Academy of the Romanian People's Republic, pp. 27–34, 1960. [Rom. summ.]

In tests by the Hellenic Cotton Res. Inst., Greece, against various fungi causing

damping-off of seedlings [cf. **39**, 105], the results of which are tabulated, the best results (increase of plants by over 100% and of yield by nearly 60) were obtained with phygon XL, granosan, and granosan M.

Solel (Z.) & Palti (J.). **Rikkavon ha-zera'im ve hole-nofel be-Kuttanah.** [Seed rot and seedling wilt in Cotton.]—*Hassadeh*, **40**, 6, pp. 685–686, 1 fig., 1960. [Heb. From author's summ.]

The most serious diseases of cotton in Israel reported from the agric. Res. Sta., Rehovot, are seed rot and seedling wilt. *Rhizoctonia* [*Corticium*] *solani* [cf. **37**, 721] is the most common fungal pathogen associated, but *Sclerotium bataticola* [*Macrophomina phaseoli*: cf. **37**, 581] and *Fusarium* spp. have also been isolated. Cotton after vegetables, and especially after groundnuts, is particularly susceptible, and crops sown in late Mar.–early Apr. when soil temp. is relatively low are more extensively affected than later sowings. Seed treatment and late sowing are recommended, especially if the spring is cool and the cotton follows vegetables or groundnuts.

Avtonomov (A. A.). О методике селекции Хлопчатника на устойчивость к фузариозному увяданию. [On methods of selecting Cotton for resistance to *Fusarium* wilt.]—Хлопководство [*Khlopkovodstvo*], **10**, 12, pp. 23–27, 3 graphs, 2 diag., 1960.

Gossypium barbadense was infected by *Fusarium* [*oxysporum* f.] *vasinfectum* [**39**, 25, 470] from 1940 onwards in almost all regions of Central Asia, when the breeding of resistant vars. was begun in Uzbekistan and Tadzhikistan, and subsequently in Turkmenistan. At the Inst. Cotton Selection and Seed-breeding, Uzbek Acad. agric. Sci., tests from 1957 onwards for the hybridization and selection of high yielding and resistant vars. were carried out on an experimentally or naturally infested substratum, which gave the best and most rapid results.

Hueck (H. J.) & La Brijn (J.). **Die schimmelfeste Ausrüstung von Baumwolle mit Pentachlorophenol and Laurylpentachlorophenol.** [The mould-proofing of Cotton with pentachlorophenol (PCP) and laurylpentachlorophenol(LPCP).]—*Textilrdsch.*, **15**, 9, pp. 467–472, 2 graphs, 1960.

At the Zentrallaboratorium TNO, Delft, Netherlands, both PCP and LPCP at 0·5 2% conferred satisfactory protection against [unspecified] moulds on heavy cotton samples in a 14-day soil-burial test with subsequent leaching. Treatment with water-repellents, e.g. mystolene or resistol, appeared appreciably to enhance the anti-fungal effect of LPCP and to increase resistance to leaching of both chemicals. Boiling the samples with lye before impregnation seemed to be essential to a successful result with LPCP.

Allan (F. J.), Allan (G. G.), & Crank (G.). **Fungitoxicity of rhodanine derivatives.**—*J. appl. Chem., Lond.*, **11**, 2, pp. 68–70, 1961.

In further studies (*Rec. Trav. chim. Pays-Bas*, **77**, p. 67; **78**, p. 375, 1959) the authors examined the efficiency of various condensation products of rhodanine and homologues with polycyclic aromatic aldehydes against [unspecified] fungi in soil-burial tests with 3-ply cotton yarn. In general, the substitution for the benzylidene group did not increase fungistatic activity, a striking exception being 3-phenyl-5-(9-phenanthrylmethylene) rhodanine, which conferred absolute protection during 4 weeks' burial under conditions which caused incipient deterioration in samples treated with pentachlorophenol. In the naphthylmethylene series replacement of the imino rhodanine H by an ethyl or phenyl group did not reduce the fungitoxicity of any of the compounds and was moderately beneficial in some. In the phenanthryl- and anthrylmethylene series fungitoxicity was reduced by replacement of

the imino rhodanine H with an ethyl group and enhanced by the substitution of a phenyl.

Schrödter (H.) & Hoffmann (G. M.). **Der Einfluß der Witterung und des Mikroklimas auf den Befall des Leins durch Polyspora lini Laff. (Ein Beitrag zur Epidemiologie pilzparasitärer Krankheiten).** [The influence of weather and microclimate on the infection of Flax by *P. lini*. (A contribution to the epidemiology of parasitic fungal diseases).]—*Zbl. Bakt.*, Abt. 2, **114**, 1, pp. 15–44, 16 graphs, 1961.

It is concluded from studies during 1956–58 at Inst. für Phytopathologie, Aschersleben, Germany, that the characteristic differences in reaction to *P. lini* [**40**, 171] of the flax vars. Löbauer Blau (fibre), Bernburger Ölfaser (combined linseed and oil), and Endress Öllein (linseed) are inherent and not attributable to modifications in the microclimate consequent on changes in the structure of the stand. Endress Öllein proved to be the most susceptible of the 3 and Bernburger Ölfaser particularly resistant.

Stands raised from non-infected and contaminated seed do not usually sustain severe damage until the onset of flowering, the increased incidence at this time being ascribed to changes induced by the development of the plants in the microclimate, the configuration of which is shifting in the direction of opt. values for the pathogen in respect of temp. (mean above 16° C.) and R.H. (over 90%). The increased frequency of opt. conditions as the growing period advances increases the risk of infection in late-sown stands and contributes to yield reductions and deterioration in quality, whereas early sown crops are almost completely healthy.

Vanterpool (T. C.). **Flax diseases in Saskatchewan in 1960.**—*Canad. Pl. Dis. Surv.*, **40**, 2, pp. 59–60, 1960.

A very severe outbreak of *Rhizoctonia* seedling blight (*Pellicularia* [*Corticium*] *praticola* [cf. **36**, 129], not *P. filamentosa* [*C. solani*: cf. **37**, 85]) occurred over widely-scattered areas.

Ryzheeva (Mme O. I.). О выведении высокомасличных, устойчивых к фузариозному увяданию сортов льна. [On breeding Flax varieties with high oil content resistant to *Fusarium* wilt.] —*Sel. Seed-Gr., Moscow*, **25**, 6, pp. 49–51, 1960.

Varieties of flax [var. *elongata*] resistant to *F. lini* [**36**, 187], such as I-7 and L-1120, have been bred at the All-Union sci. Res. Sta. for Flax and its sub-stations, but many local vars. are 95–100% susceptible. Selections were made from the world flax collection at the Kuban exp. Sta., All-Union Plant Cultivation Inst., of resistant samples which could serve as initial breeding material. Though resistance was obtained with these at the exp. base of the All-Union sci. Res. Inst. for Olive Oil and other essential Oil Crops, oil content was poor. Crosses were therefore made of the best Soviet susceptible vars. with high oil content and resistant vars. from Canada, U.S.A., Argentina, etc. Assessments in 1957–59 showed that where one parent was especially resistant to *F. lini* F_1 progeny were also to some extent resistant, and where the maternal form was resistant and the paternal susceptible the percentage of losses in the progeny was much lower than with the reciprocal. Resistant lines with early ripening and good productivity were produced but were not sufficiently constant and the work is continuing. In 1959 seed was obtained by double selection resistant to *F. lini* and with 45–48·2% oil content on a dry wt. basis.

Lochhead (A. G.) & Cook (F. D.). **Microbial growth factors in relation to resistance of Flax varieties to Fusariu m wilt.**—*Canad. J. Bot.*, **39**, pp. 7–19, 1961. [33 ref.]

In further studies at the Microbiol. Res. Inst., Canada Dept Agric., Ottawa [**19**,

422], of bacteria isolated from root and seed surfaces of Bison flax, resistant to *F. oxysporum* f. *lini* [*F. lini*], the percentage which required growth-promoting substances was greater than among isolates from the susceptible Novelty, indicating a more pronounced rhizosphere effect by the susceptible than the resistant var. Two strs. of *F. lini* required no vitamins for growth and thiamine had a depressing effect. Bacteria from the resistant var. had a greater ability to depress the growth of *F. lini* than those from the susceptible var. The results indicate the potential value of studying growth-promoting substances in relation to the activity of soil-borne pathogens.

Todorova (Mme V.). Пасмо — една нова и опосна болест Лена. [Pasmo—a new and serious disease of Flax.]—*Bull. Inst. bot., Sofia*, **7**, pp. 345–349, 1960. [Russ., Engl. summ.]

Mycosphaerella linorum [map 18] was first noted in Bulgaria in 1957, when conditions favoured its development and losses were severe. The fungus was isolated from infected plant parts, but not from seed. The disease appears to have been introduced with imported seed.

Mycology and Plant Pathology.—*Rep. Indian Jute Comm. 1958–59*, pp. 54–66, 1960.

In this report [cf. **37**, 723] a study of the microflora of jute fields is detailed, which showed that when only *Macrophomina phaseoli* [**38**, 568] was present, jute plants often survived up to harvest with infection in a branch root or roots, but *Fusarium* spp. in jute-potato fields, particularly those of the *F. solani* group, in conjunction with *Rhizoctonia* sp. [**38**, 601] killed the plants more quickly than *M. phaseoli* alone.

At a given age a late sown crop of the early maturing susceptible JRC-412, sown for the 2nd yr., had more stem rot (*M. phaseoli*) infection than an early sown crop. On a given date with opt. conditions for infection (late July and all Aug.) early sown crops were more resistant to necrosis and gave better yields than late sown. *M. phaseoli* isolated in Mar. from potato stolons from jute-potato fields proved more virulent and quicker in initiating pathogenic symptoms than isolates from jute stubbles in Feb. of the same yr. Younger plants (diam. less than 0·8 cm.) were all killed, while thicker plants survived for longer periods.

Early sporulation of *Colletotrichum corchorum* [**38**, 695] was favoured at 37° C., but was adversely affected in the absence of light. Spores produced in darkness were not as uniform in shape and size as those produced in light. Spores from the field did not germinate when humidity was below 86%. Infection in old field plants started in the 2nd week of July and continued to spread until mid-Aug.; during this period the humidity was 86·99% for at least 3 hr. in early morning. Germinating spores infected stipules, young leaf buds, and the midrib of the leaf on the dorsal side; under favourable circumstances there was direct infection of soft stems. Secondary anthracnose infection through primary foci of *M. phaseoli* was very common.

Plot sample counts in varietal trials with improved *Corchorus capsularis* vars. showed that JRC-918, JRC-206, My-11642, and D-154 were superior with regard to stem rot and other diseases.

Phytophthora parasitica [**23**, 18] from *Hibiscus sabdariffa* in various localities proved equally virulent on it at Nilganj under favourable temp. (24–26°). Infection spread rapidly with rain water, max. infection occurring in fields where the soil remained moist or waterlogged for a considerable period. Field tests with Cu oxychloride and captan showed little effect on the incidence of foot and stem rot, though these fungicides were effective to various degrees in the laboratory. At Tarakeswar liming up to 40 maunds/acre over 3 consecutive yr. reduced infection appreciably in root and stem. Thereafter additional lime was not useful, in some places incidence even increasing. Lime in combination with K (muriate of potash)

at 50 lb. K_2O/acre for 5 yr. consecutively reduced infection from 34% in 1954 to 8% in 1958. Potato has been the most important source of the primary pathogen *M. phaseoli*, which was almost universally isolated from potato stolons, and also of the secondary pathogens.

Mukherji (N.) & Ghosh (T.). **Corynespora spp. on Jute.**—*Sci. & Cult.*, **26**, 6, pp. 270–271, 1 fig., 1960.

The *C.* sp. [**36**, 666] described from the Jute agric. Res. Inst., Barrackpore, occurred alone or mostly in association with *Cercospora corchori* [**33**, 449] on leaves and capsules of jute (*Corchorus capsularis*) but not on the stem. Incidence starts in early Sept. and is at its peak in late Sept. The fungus, which affects quantity and quality of seed, produces brown spots on leaves, mostly circular but sometimes irregular. On capsules the spots are small, the fungus on the surface being ashy grey. The mycelium is partially immersed in host tissue but forms a distinct layer superficially. On potato dextrose agar there is a white fluffy growth which later becomes cobwebby and dull yellowish buff. Vegetative hyphae are of 2 types: narrow, hyaline to brownish septate, irregularly branched, thin walled, 1·7–3·09 μ diam., and broader ones, brownish to brown, septate, regularly branched, comparatively thick walled, 3·44–6·88 μ diam. The fungus compares well with *Corynespora cassiicola* but is like *C. homaliicola* in that the mycelium on the capsule cannot be considered scanty.

Orlob (G. B.). **Some diseases on ornamentals in New Brunswick.**—*Canad. Pl. Dis. Surv.*, **40**, 2, pp. 66–71, 1960.

A number of virus diseases, identified on the basis of symptoms only, are noted. Bacterial diseases included *Pseudomonas delphinii* on *Delphinium*, and *Bacterium* [*Erwinia*] *tardicrescens* on *Iris*. In the Fredericton area *Peronospora grisea* was found on *Veronica*. Scattered reports were received of *Botrytis paeoniae* on peony. *Iris* was often attacked by *Heterosporium iridis* [*Mycosphaerella macrospora*: **38**, 560], rose by *Mycosphaerella rosicola*, *Zinnia* by *Alternaria zinniae*, *Phlox* by *Septoria divaricata*, and *Lychnis* by *S. lychnidis*.

Other diseases recorded were *Microsphaera alni* on lilac, *Puccinia dioicae* on *Oenothera*, *P. millefolii* on *Achillea*, and *Coleosporium asterum* on aster.

Moriondo (F.). **Nuove probabili virosi di piante ornamentali.** [New probable viroses of ornamental plants.] - Reprinted from *Riv. Ortoflorofruttic. ital.*, **43**, 5–6, 9 pp., 5 fig., 1958. [Fr. summ. 25 ref. Received Feb. 1961.]

In Tuscany, Italy, *Pelargonium zonale* develops yellow spots 1–5 mm. diam., transparent against the light (possibly *Pelargonium* leaf curl virus). In summer the chlorotic areas generally dry up and the affected leaves fall off.

Leaves of *P. zonale* and *P. peltatum* × *P. zonale* may bear a yellow, sometimes very wide, stripe running along the margin. The edge of the stripe is well-defined on the side towards the base of the leaf, but on the other shades off indistinctly. On mature leaves the stripe is narrow and discontinuous. The symptoms resemble those attributed to *Bacterium* [*Pseudomonas*] *barkeri* [cf. **13**, 517], but in Ciferri's view are probably due to a virus.

Tropaeolum majus plants may have a mosaic pattern on the leaves, remain small, and in hot, dry weather wilt and die. This condition is also thought to be due to a virus. Further studies are in progress.

Graham (S. O.). **Apical necrosis in ornamental foliage plants caused by rapid temperature changes.**—*Plant Dis. Reptr*, **45**, 1, p. 41, 1961.

At Wash. agric. Exp. Sta., Pullman, cuttings of certain plants, notably of the gen. *Monstera*, *Ficus*, *Philodendron*, *Dracaena*, and *Dieffenbachia*, developed necrosis

of the new leaves shortly after potting. Experiments showed that a rise of 35° F. produced necrosis, though a rapid drop did not. No pathogen was found. Cuttings should be packed in insulated containers for transit and only brought slowly to high greenhouse temps.

KERLING (L[OUISE] C. P.) & BRANTS (D. H.). **Een virus in Atropa belladonna.** [A virus in *A. belladonna*.]—*Tijdschr. PlZiekt.*, **66**, 5, pp. 288–294, 1 pl. (2 fig.), 1960. [Engl. summ.]

At Baarn, Netherlands, belladonna plants developed symptoms resembling those of belladonna mosaic virus described by Smith [**36**, 303; cf. **39**, 221] and the reaction of inoculated solanaceous test plants suggested identity with this virus. The dilution end point was 10^{-3}–10^{-4}; inactivation occurred at 70–80° C.

GRAAFLAND (W.). **The parasitism of Exobasidium japonicum Shir. on Azalea.**—*Acta bot. neerl.*, **9**, 4, pp. 347–379, 1 pl., 7 fig., 4 graphs, 1960. [59 ref. Also published as *Meded. phytopath. Lab.* '*Scholten*' 33.]

This paper from the phytopath. Lab. 'Willie Commelin Scholten', Baarn [**37**, 725] covers azalea (*Rhododendron*) cultivation in the Netherlands, the occurrence of the disease caused by *E. japonicum* [cf. *E. azaleae*: **40**, 112] and its experimental induction, and the relations between *E.*, *Ustilago*, *Tilletia*, and *Taphrina*.

When dormant buds were inoculated with basidiospores and suspensions from shake cultures and the shoots simultaneously decapitated to stimulate the inoculated axillary buds, the number of galls on the newly formed shoots increased greatly. The number of galls formed did not appear to be affected by the source of the inoculum, whether basidiospores or cells from a shake culture.

Basidiospores and blastospores appeared to be uninucleate. Blastospores arising from a single cell of a shake culture or from a single basidiospore induced gall development, from which it is concluded that the fungus is homothallic.

In cross inoculations the azalea pathogen did not infect *Vaccinium vitis-idaea* and azaleas were not attacked by *E. vaccinii*. This difference and the difference in colony colour *in vitro* is considered to be of specific importance.

By inoculating the leaves at different intervals after the buds had begun to unfold, i.e. after shoot tip removal, it was found that they remain susceptible until 8–10 mm. long. In dormant axillary buds treated with a spore suspension the fungus was still viable after 6 months, galls developing on the unfolding leaves after the shoot apex had been removed.

Dormant buds should be protected by a fungicide against windborne spores. Captan at 0·2 g./l. strongly inhibited mycelial growth. Reduction in the number of galls that formed appeared to be greatest when the fungicide and the inoculum were applied simultaneously.

ZUMMO (N.). **Studies on chemical control of petal blight of Camellia incited by Sclerotinia camelliae.**—*Diss. Abstr.*, **21**, 3, pp. 421–422, 1960.

At La State Univ. apothecial formation by *S. camelliae* [**38**, 368], which is spreading throughout the southern States, was suppressed by terraclor at 200 lb./acre in 2 split applications to the soil beneath the plants for 1 season and at 600 lb. for 2 seasons. One application of 100 lb. captan+terraclor (50+50) was effective for 1 season.

Terraclor was toxic to *Magnolia fuscata* when applied to the soil or the foliage, causing chlorosis and finally defoliation.

DELEVICH (B.). Прилог проучавању сузбијања **Heterosporium echinulatum (Berk.) Cooke,** паразита Каранфила. [A study on the control of *Didymella dianthi*, a parasite of Carnation.]—Зборн. Рад. Пољопр. Фак. Унив.

Београд [*Zborn. Rad. Poljopr. Fak. Univ. Beograd*], **6**, 2, pp. 115–125, 1958. [Engl. summ. Abs. in *Referat. Zh. Biol., 1960*, 20, p. 178, 1960.]

Best control of *D. dianthi* [cf. **39**, 472] was obtained in field experiments in the damp summer of 1955 at the Inst. Phytopathol., Yugoslavia, with 4 sprays of 1% $CuSO_4$ and Bordeaux mixture to which emubor (50 g./100 l. solution) was added as a sticker.

McFadden (L. A.). **A bacterial leaf spot of florists' Chrysanthemums, Chrysanthemum morifolium.**—*Plant Dis. Reptr*, **45**, 1, pp. 16–19, 2 fig., 1961.

In 1957 this disease was reported to the Sub-trop. Exp. Sta., Homestead, Fla [**40**, 150]. The circular or elliptical, slightly sunken spots reach 1 cm. diam. and coalesce into large necrotic areas; they spread upwards from the older leaves. Flower bud infection may also occur. The pathogen, easily isolated, proved to be *Pseudomonas cichorii*. It was controlled by weekly sprays of tribasic $CuSO_4$ at 4 lb./100 gal. and agrimycin 500 at 3 lb. 100 gal. without injury to leaves or flowers. Agristrep and agrimycin 100 are slightly less effective.

Ruokola (Anna-Liisa). **Über die durch Pilze verursachte Welke an Clarkia.** [On wilt of Clarkia caused by fungi.]—*Maataloust. Aikakausk.*, **32**, pp. 158–160, 1960.

In the rainy summer of 1958 at the exp. farm Viik, Helsinki Univ., extensive wilt symptoms developed on *Clarkia elegans*, the plants were stunted and died, and *Botrytis cinerea* [cf. **28**, 160] and *Fusarium poae* [cf. **17**, 114] were isolated from lesions at the stem bases. Tests showed that these fungi can infect *C.*, but that in the field they cause serious damage only when R.H. is above normal.

Herridge (Elizabeth Anne). **Anatomy and pathology of leaf spots on English Holly, Ilex aquifolium (Tourn.) L.** —*Diss. Abstr.*, **21**, 3, pp. 416–417, 1960.

Spots of fungal origin, investigated at Ore. State Coll., were irregular, swollen areas, ultimately appearing as translucent or red-black cushions on both leaf surfaces; they contained intercellular mycelium, causing hypertrophy and proliferation, mostly in the spongy mesophyll. Isolates associated with these spots included *Asteroma*, *Phomopsis*, *Coniothyrium*, *Alternaria*, *Stemphylium*, *Epicoccum*, *Pullularia*, and an unidentified phycomycete.

Chemical damage was manifested by slightly raised, discrete, round, red-black spots. The substomatal chambers contained enlarged cells with unilaterally thickened walls, which were the first to become necrotic. Hypertrophy rarely extended to the palisade tissue and on the adaxial surface there was merely a reddish discoloration.

Mechanical damage was indicated by phellogen and cork formation and by funnel-shaped lesions in cross sections.

Narrow, shallow lesions, usually involving single epidermal cells, usually empty, were associated with insect damage.

Zaleski (K.), Błaszczak (W.), & Glaser (T.). **Badania nad biologią i chorobotwórczością 4 gatunków Fusarium z Łubinów i 2 szczepów Rhizoctonia solani oraz próby ich zwalczania w warunkach szklarnianych.** [Studies on the biology and pathogenicity of 4 *F.* spp. from Lupins and of 2 *Corticium solani* strs., and control trials under glasshouse conditions.]—*Prace Kom. Nauk roln. leśn., Poznań*, **5**, 7, pp. 1–63, 17 fig., 6 graphs, 1960. [Engl. summ. 23 ref.]

Isolates of *F. anguioides*, *F. bulbigenum*, *F. culmorum*, and *F. solani* from lupins, collected at Inst. Agric. Manuring Soil Sci., Przebędowo, Poland, and identified from Raillo's work [**31**, 148], were investigated for the influence of media, temp., pH, N sources and levels, macroscopic features, and sporulation. In inoculation tests *F. culmorum* and *F. anguioides* were severely pathogenic to lupin seeds and

seedlings, the 2 *C. solani* strs. (1 from lupin, 1 from potato) less so, and *F. solani* not at all. Two new forms were established: *F.a.* f. 2 pathogenic to Biały Przebędowski wczesny, Żółty past. Popularny, and Żółty gorzki populacja miejsc., but not to Wąskolistny Obornicki lupin, and *F.b.* var. *pisi* f. 1 pathogenic to none of these.

Perez (J. E.) & Cortés-Monllor (Amelia). **Survey for the presence of Tobacco mosaic, Cymbidium mosaic, and other viruses in Orchids.**—*J. Agric. Univ. P.R.*, **44**, 3, pp. 138–149, 3 fig. (1 col.), 1960. [Span. summ. 12 ref.]

By serological studies [cf. **34**, 153] of material from 13 orchid nurseries in Puerto Rico, the results of which are tabulated, variegated *Cattleya* flowers and *C., Epidendrum,* and *Calanthe* leaves were shown to be infected by tobacco mosaic virus [**36**, 322]+[orchid] (Cymbidium) mosaic [cf. **37**, 484]. TMV always occurred in association but the latter occurred alone in serologically detectable amounts in *Cattleya* flowers with mild pigment disturbances and in plants of a number of orchid genera. The results illustrated the non-reliability of visual observations for diagnosis of virus in orchid leaves. The inability of the precipitin test used to detect traces of the viruses was disclosed in some instances by subsequent inoculations to test plants.

Geranium rust.—*J. Agric. W. Aust.*, (4th ser.), **1**, 11, pp. 987–988, 2 fig., 1960.

A note on the occurrence and control of *Puccinia pelargonii-zonalis* [cf. **39**, 317], common on susceptible *Pelargonium* vars. growing in sheltered situations. Reduction of humidity, hard winter pruning, and spraying with colloidal S or zineb (1 oz./3 gal.) are recommended.

Mokritskaya (Mme M. S.). Обзор видов рода **Phragmidium Link** на **Rosa L.** [Review of the species of the genus *P.* on Rose.]—*Bot. Zh. S.S.S.R.*, **46**, 2, pp. 270–275, 1961. [20 ref.]

This account from the V. L. Komarov bot. Inst. Acad. Sci. U.S.S.R., Leningrad, contains an annotated survey of the literature and the author's proposed classification of 27 (18 Soviet) *P.* spp. [cf. **39**, 714], based on J. C. Arthur's division [cf. **13**, 728] into sect. *Eu-Phragmidium* (23) and *Earlea* (4). An identification key with hosts is included.

Meyer (M. A.). **Virus diseases of Roses in South Africa.**—*S. Afr. J. agric. Sci.* **3**, 3, pp. 467–471, 1 pl. (7 fig.), 1960.

Various virus symptoms of the mosaic type have been observed in S. Africa on rose vars. (listed). Rose wilt [cf. **38**, 523] has so far been recorded only in Pretoria. Another disease causing loss of vigour and premature decline is named little leaf. Instead of the buds developing normally to form single vigorous shoots they become multiple, producing a number of short pale shoots. Little leaf has been observed only in hybrid tea and floribunda vars. and the cause has yet to be determined.

Tandon (R. N.) & Bilgrami (K. S.). **A new host of Phyllosticta cycadina Pass.**—*Sci. & Cult.*, **26**, 6, pp. 277–278, 1960.

A serious *Phyllosticta* infection on the leaves of *Sansevieria macrophylla* was observed in 1959 in the bot. Gardens, Allahabad Univ., where *P. cycadina* [**34**, 724] commonly occurs on *Cycas revoluta*. A comparison showed that both fungi have hyaline, minute, oval or slightly cylindrical pycnospores, 2·3–2·6 × 0·5–0·7 μ. The range of pycnidial size is also similar (153 × 136–35 × 21 μ on *Cycas* and 149 × 134–37 × 25 μ on *Sansevieria*). Inoculations established pathogenicity of both isolates on *S. macrophylla* and of single spore cultures of *P.* from *S. macrophylla* on leaves of *C. revoluta*.

Lukens (R. J.) & Stoddard (E. M.). **Diseases and other disorders of turf.**—*Circ. Conn. agric. Exp. Sta.* 208, 11 pp., 1959. [Received Mar. 1961.]

After an introductory paragraph on the general control of turf diseases notes are given on the symptoms, cause, and control of snow mould of bent grasses (*Agrostis* spp.), fescues (*Festuca* spp.), and bluegrass (*Poa pratensis*, little affected) caused by various fungi, including *Calonectria nivalis* [cf. **37**, 50], *Typhula itoana* [cf. **39**, 26], and *Sclerotinia borealis*, the last-named not known to occur in Conn. [cf. **37**, 363]; bluegrass leaf spot and foot rot (*Helminthosporium vagans*) [**31**, 331 *et passim*], zonate eyespot (*H. giganteum*) [cf. **31**, 330], and 'melting out' (*Curvularia* spp.) [loc. cit.]; brown patch of bents and fescues (*Corticium solani*) [loc. cit.]; dollar spot (*S. homoeocarpa*) [cf. **40**, 52], attacking bent grasses and, under severe conditions, fescues; and copper spot of bents (*Gloeocercospora sorghi*) [cf. **35**, 192, 380]. A sect. is devoted to fungicidal control, with notes on various suitable types of chemicals.

Theis (T.), Sotomayor-Ríos (A.), & Calpouzos (L.). **Inflorescence blight on a Napier grass × cattail Millet hybrid caused by Ephelis trinitensis (Balansia claviceps).**—*Plant Dis. Reptr*, **45**, 1, pp. 72–75, 1 fig., 1961.

At the Fed. Exp. Station, Mayaguez, P.R., inflorescences of this hybrid of *Pennisetum purpureum* and *P. glaucum* became infected by conidial *B. claviceps* [cf. **30**, 491] and a bushy appearance was induced from excessive branching. The disease was systemic but left some disease-free shoots in which the inflorescences appeared normal.

Batista (A. C.) & Bezerra (J. L.). **Uma nova fumagina de Sorghum halepense (L.) Pers.** [A new sooty mould of *S. halepense*.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **18**, pp. 168–170, 1 fig., 1960. [Engl. summ.]

A n. sp., *Phaeoxyphium sorghi* Bat. & Bez., which caused sooty mould of *S. halepense* in Brazil in association with other fungi, is described.

Hájek (J.). **Antimikrobiální látky v kořenovém systému některých trav a leguminóz.** [Antimicrobial substances in the root system of some grasses and legumes.]—*Ann. Acad. tchécosl. Agric.*, **34**, 1, pp. 95–114, 1 pl. (4 fig.), 1961. [Russ., Germ., Engl. summ. 29 ref.]

Tests by Fodder Res. Inst., Pohořelice, Czechoslovakia, are presented in detail. Root extracts from 7 spp. of legumes were more phytoncidal to the micro-organisms examined than those from 20 grasses, and the bacteria studied were more inhibited than the fungi (*Aspergillus niger*, *Fusarium nivale* [*Calonectria nivalis*], and *Sclerotinia trifoliorum*). *C. nivalis* was most susceptible to the phytoncides of *Poa nemoralis*, *Agrostis alba*, *Phleum pratense*, *Anthoxanthum odoratum*, and clover, and *S. trifoliorum* to those of clover and *P. pratense*. Both fungi were also inhibited by *Bacillus subtilis*.

Orlob (G. B.). **Observations on the occurrence of grass and forage diseases in New Brunswick.**—*Canad. Pl. Dis. Surv.*, **40**, 2, pp. 78–86, 1960.

The 62 diseases found during 1960 on the more common grasses and on lucerne and clover in examinations of 15 localities in N.B. are listed and annotated.

Mikhaĭlova (Paraskeva). Нови паразитни гъби, причиняващи листни петна по фуражните леguминозни растения. [New parasitic fungi causing leaf spots on forage leguminous plants.]—Раст. Защ. [*Rast. Zasht.*], **8**, 4, pp. 45–47, 2 fig., 1960.

A report from Inst. Plant Prot., Sofia, Bulgaria, on the occurrence of *Ascochyta trifolii* on white clover and *Phyllosticta onobrychidis* on esparcette beans (*Onobrychis* spp.) [cf. **39**, 718], the latter being a new record. *P. onobrychidis* formed

black-brown spots on stalks and petioles and tiny brown spots on the upper leaf surface (30–40/leaf), which subsequently became paler in the centre and visible on the lower side. For control it is recommended to sow esparcette thinly and, if the attack is severe, to cut before the fructifications mature.

Drbal (J.). **Příspěvek k poznání životnosti sklerocií rakoviny Jetelovin (Sclerotinia trifoliorum Erikss.) v půdě.** [A contribution to the knowledge of the viability in soil of Clover rot (*S. trifoliorum*) sclerotia.]—*Ann. Acad. tchécosl. Agric.*, **34**, 1, pp. 139–148, 1961. [Russ., Germ., Engl. summ.]

Analyses by Fodder Res. Inst., Pohořelice, Czechoslovakia, of soil samples from sites infested by *S. trifoliorum* demonstrated max. occurrence of sclerotia down to a depth of 5 cm., though present to 20 cm. In the upper layer numbers decreased from 172 in Apr. to 16 in Nov. 1955, whereas in the lower layers they remained largely unchanged. Three yr. after an infected clover crop the number of sclerotia was so low that it could no longer be accurately determined.

Salonen (A.). **Das Vorkommen von Botrytis anthophila Bond. in Proben von Handelssaatgut finnischen Rotklees.** [The occurrence of *B. anthophila* in samples of commercial seed of Finnish Red Clover.] —*Maataloust. Aikakausk.*, **32**, pp. 186–189, 2 fig., 1960. [Finn. summ.]

B. anthophila was isolated at the phytopathol. Inst., Helsinki Univ., from samples of the 1957 harvest from S. and C. Finland, a new record for the country [map 167; cf. **38**, 752].

Latch (G. C. M.). **Stem diseases of Sweetclovers.**—*Diss. Abstr.*, **21**, 3, pp. 418–419, 1960.

A more detailed account of studies already noticed [**40**, 174]. *Mycosphaerella lethalis* and, to a lesser extent, *Ascochyta caulivora* were soil transmissible; pycnidia of both were seen on *Melilotus* seed coats.

Moroniowa (Halina). **Pseudopeziza meliloti Sydow na Melilotus albus w Pawlowicach pod Wrocławiem.** [*P. meliloti* on *M. albus* at Pawlowice near Wrocław.] —*Monogr. bot., Warsz.*, **10**, 2, pp. 103–105, 1 fig., 1960. [Fr. summ.]

A report from Zakład Fitopatologii WSR, Wrocław, on the 1st occurrence in Poland.

Erwin (D. C.) & Katznelson (H.). **Studies on the nutrition of Phytophthora cryptogea.**—*Canad. J. Microbiol.*, **7**, 1, pp. 15–25, 2 graphs, 1961. [25 ref.]

At the Microbiol. Res. Inst., Canada Dept Agric., Ottawa, a *P. cryptogea* isolate from lucerne roots [**34**, 458] grew well on a synthetic medium (pH 5·6–7·2) with sucrose as the C source. The best N source was L-aspargine, though 1 variant from a single oospore would not grow on this medium. The fungus required 12–25 µg/l. thiamine, sufficient of which was provided by lucerne root extract, which also stimulated growth to 30% more than the synthetic medium. Growth of *P. cryptogea*, *P. drechsleri*, *P. parasitica*, and *P. boehmeriae* was stimulated by $CaCl_2$.

Frank (Z.) & Palti (J.). **Katamtame Pseudopeziza be-Aspeset.** [*Pseudopeziza* lesions on Lucerne.] —*Hassadeh*, **40**, 5, pp. 572–573, 1 fig., 1960. [Heb. From author's summ.]

P. medicaginis is reported from the agric. Res. Sta., Rehovot, as occurring on lucerne in Israel from Dec., with max. development in Feb.–April, gradually disappearing in May–June. The disease is common in the coastal plain, N. and W. Negev, and in the Huleh Valley, but rare in the Jordan and Beisan valleys. Severe losses may result from delay in harvesting as the fungus causes considerable leaf-fall. Control is not usually practicable.

Munjal (R. L.) & Gill (H. S.). **Pellicularia rolfsii (Sacc.) West on Symphytum sp.** —*Sci. & Cult.*, **26**, 1, p. 48, 1960.

In June 1959 a serious disease of *Symphytum* sp. occurred on [imported] experimental material growing at the Indian agric. Res. Inst., New Delhi, over 60% of the plants wilting completely. Affected material bore sclerotia typical of *Sclerotium rolfsii* [cf. **38**, 657], the asexual state of *Pellicularia rolfsii* [cf. **35**, 99].

Current research, investigation and experiments.—*Orchard., N.Z.*, **33**, 10, pp. 329–331; 11, pp. 361–362, 1960.

To check earlier indications that a combination of phenyl mercury chloride (PMC) and captan caused stunting and rolling of Delicious apple foliage and to test the effect of $MgSO_4$ (5 lb. 100) added to the mixture a small trial was made at Appleby. At the pink stage trees sprayed with the compounds had smaller, paler leaves than unsprayed, but from petal fall onwards all trees had equally healthy foliage.

Results from a 3 yr. pilot trial to test the effect of a virulent str. of apple mosaic virus [**39**, 114] on growth and yield show that it caused marked tree stunting and heavy crop reduction. At Mt. Albert, where very mildly infected buds were worked into severely infected stocks, trees with only very mild symptoms were produced. During the 1960 budding season the 1st small consignment of mosaic-free budwood of Red Jonathan and Jonathan was sent to the Levin nursery; also the 1st trees were planted in a small block of mosaic-free budwood trees which is being established at Havelock North.

The effectiveness of a new spray material oleocop (4% Cu_2O+25% mineral oil) against verrucosis [*Elsinoe fawcettii*: **39**, 719] on severely infected standard lemons was compared with 3:4:50 Bordeaux mixture, both applied at half petal fall in late Nov. and again in early Jan. Trees and fruit were very clean and bright compared with the Bordeaux-sprayed trees, which were covered with unsightly spray residues. Infection of fruit in both treatments was still fairly high but to date slightly less infection was recorded on the oleocop sprayed trees.

If apples are picked on the day of spraying with diphenylamine (DPA) superficial scald is controlled as well as by oiled wraps, but both are less effective than DPA-impregnated wraps or a post-harvest dip of DPA [cf. **40**, 55 and below]. Low levels of DPA were used without damage to fruit, and the method is now commercially usable. On 3 vars. almost complete control was obtained by santoquin at 2,000 p.p.m.

On George Wilson plum trees near infected trees bacterial spot [*Xanthomonas pruni*: **39**, 718] was controlled by streptomycin paint at planting, weak Bordeaux mixture at leaf opening with a 2nd application 10 days later, streptomycin in late summer and early autumn, and normal strength Bordeaux at leaf fall [cf. **38**, 15]. This var. on peach seedling stock may prove to be more resistant than on Myrobalan stock. Buck plum rootstock is relatively resistant.

Padfield (C. A. S.). **The use of diphenylamine and other chemicals to control superficial scald of Apples.**

Padfield (C. A. S.) & Smock (R. M.). **Control of superficial scald on Granny Smith Apples using pre-harvest sprays of diphenylamine.**—*N.Z.J. agric. Res.*, **2**, 5, pp. 953–970, 7 fig., 1959; **3**, 4, pp. 675–679, 1960.

Some of the information in the first paper has been noticed in brief [**39**, 718].

The D.S.I.R., Havelock North, N.Z., conducted trials of pre-harvest spraying on Granny Smith apple trees at Hastings, using 500-1,500 p.p.m. of DPA [cf. above] in an aqueous suspension (either from a conc. alcoholic sol. or from a wettable powder). Development of superficial scald was reduced in cool storage, but not

eliminated. Three days' delay between treatment and harvest had no consistent effect on control, but as pre-harvest sprays allowed an appreciable amount of scald to develop they are not at present recommended for N.Z. fruit intended for prolonged storage, post-harvest applications of DPA being more effective.

Brook (P. J.) & Harrow (K. M.). **Experiments towards control of bitter rot in Apples.**—*Orchard., N.Z.*, **34**, 1, pp. 21–23, 1961.

At Mt. Albert 30–35 Sturmer trees were sprayed with p[henyl] m[ercury] c[hloride] and later with 4 sprays of captan in comparison with standard Bordeaux mixture against *Glomerella cingulata* [**40**, 313] without significant difference when captan was used with a sticker, except that Bordeaux caused severe russet. For Granny Smith or other copper-tolerant vars. it is not worth changing the schedule. Some formulations of colloidal copper, especially ialine and Ivory's, may be suitable substitutes—if carefully chosen—where application is difficult. Captan and phaltan with a sticker could reduce *Glomerella* without causing damage.

Woodhead (C. E.). **Bitter-pit investigations in 1960.**—*Orchard., N.Z.*, **34**, 1, pp. 9–13, 1961.

In 6 orchards at Hastings and Nelson delaying harvest of Cox's Orange Pippins until 15 Feb. effectively reduced bitter pit [**39**, 476] in 200 test apples of 2 grades after cool storage for 6 weeks. Incidence in Golden Delicious, though low, suggests further trouble in future. No proof was found that locality influenced maturity and hence a possible standard district harvest period [**37**, 487].

Apple powdery mildew.—*Adv. Leafl. Min. Agric. Lond.* 205, 5 pp., 2 fig., 1960.

A revised leaflet dealing with the symptoms, life-history, and control of *Podosphaera leucotricha* [**40**, 114].

Talvia (P.). **Various species of Gloeosporium in stored Apples in Finland.**—*Maataloust. Aikakausk.*, **32**, pp. 239–246, 1 fig., 1960. [Finn. summ.]

At Tikkurila *G. perennans* [*Pezicula malicorticis*] and *G. album* [*P. alba*] were found to be the most important agents of apple rot in 20 vars. of stored apples from different parts of Finland. Infection spots of both appeared in Jan. All vars. proved susceptible, though varyingly so to one or other pathogen. Rot was reduced by (*a*) the spraying of growing fruit, (*b*) dry weather in late summer, and (*c*) carbon dioxide treatment (4·5–7%) in storage.

Gjaerum (H. B.). **Kjemikalieskade på Eplefrukt efter seinsprøytning.** [Chemical injury on Apple fruits after late spraying.]—*Frukt og Bær, 1960*, pp. 31–36, 4 fig., 1960. [Engl. summ.]

Brown, scald-like, sometimes crescent-shaped spots on Gravenstein apples sprayed against scab [*Venturia inaequalis*] with captan 50 1–2 weeks before picking in the autumn of 1958 in several districts of Norway were found to contain a residue of the fungicide. In laboratory tests on 14 vars. with a number of anti-scab compounds, captan, dichlone [**38**, 728], dodine [**40**, 336], delan, mesulfan, phaltan, and tuzan (tuzet) [cf. **38**, 213] caused damage to fruits stored for upwards of 2–3 weeks. Thiram was also damaging after it had been stored for 3 yr. The development of the spots was delayed at 2° C. After 3 months' storage apples sprayed with captan up to 3 weeks before picking were transferred to the laboratory where a slight discoloration appeared under the residue a few days later. Among the non-phytotoxic fungicides tested was zineb, which is accordingly recommended for late scab control except in localities subject to severe attacks by *Gloeosporium* spp. [**38**, 151], where the relatively safe thiram should be substituted.

Sharp (P. F.). **Research on Pear decline organized to find means to control or to live with the disease.**

Reed (A. D.). **Ramifications of the Pear decline disease in the general economy of California.**—*Calif. Agric.*, **15**, 1, pp. 2–3; 2, pp. 2–3, 1961.

It is estimated that loss from pear decline during 1960 in Calif. [**40**, 315] was 15,000 tons. More than 150,000 Bartlett pear trees (91% of the total pear acreage) have been killed since the disease 1st appeared in March, 1959. The only practical means of control at present is by replanting on resistant rootstocks, such as var. Old Home.

Ziller (W. G.). **Pear rust (Gymnosporangium fuscum) in North America.**

McCain (A. H.). **Gymnosporangium fuscum found on Pears in California.**—*Plant Dis. Reptr*, **45**, 2, pp. 90–94, 6 fig.; p. 151, 1961.

The occurrence of pear trellis rust (*G. fuscum*) [cf. **36**, 279] on pear in one area in Victoria, B.C., is believed to be the 1st record in N. America. It is thought that the pathogen was imported on juniper (*Juniperus sabina*) from Europe 15 yr. ago. Details of the taxonomy, life-history, symptoms caused by, and control of the rust by spraying or eradication of infected junipers are given.

In the 2nd paper *G. fuscum* is also newly reported on pear near Lafayette, Calif.

Rimpau (R. H.). **Entomosporium maculatum Lév. als Erreger einer Fruchtfleckenkrankheit von Cydonia oblonga Mill.** [*Fabraea maculata*, the agent of a fruit spot disease of *C. oblonga*.] –*Phytopath. Z.*, **40**, 2, pp. 143-146, 2 fig., 1960. [Engl. summ.]

A 1st report [for Switzerland] from the Eidg. Techn. Hochschule, Zürich, of severe fruit spot of quince caused by *F. maculata* [cf. **38**, 699; **39**, 597]. The symptoms are described and the host specificity of this parasite is briefly discussed.

Cation (D.). **A determination of necrotic-ring-spot virus in Michigan Peach orchards and nursery stock.**—*Plant Dis. Reptr*, **45**, 2, pp. 109–111, 1961.

Peach necrotic ring spot virus [peach ring spot virus str.: **38**, 610] was prevalent in nursery trees and young plantations in Mich. but not in older trees. From 20 yr.'s observations and indexing tests it would appear that the virus does not spread in this area but has been introduced in infected rootstocks and scions.

Hampton (R. E.) & Fulton (R. W.). **The relation of polyphenol oxidase to instability in vitro of Prune dwarf and Sour Cherry necrotic ringspot viruses.**—*Virology*, **13**, 1, pp. 44–52, 2 graphs, 1961. [21 ref.]

Some of this information from Dept Plant Path., Univ. Wis., Madison, has been noticed [cf. below]. Tissue extracts with prune dwarf and cherry (sour) necrotic ring spot [peach ring spot: **40**, 177] viruses lost their infectivity within a few hr., apparently inactivated by the oxidized polyphenols of the host.

Hampton (R. E.). **Factors affecting the stability of mechanically transmitted viruses of stone fruits.**—*Diss. Abstr.*, **21**, 3, p. 416, 1960.

At Univ. Wis. sour cherry necrotic ring spot virus (NRSV) and sour cherry recurrent necrotic ring spot virus (RNRSV) [both peach ring spot virus: cf. **39**, 601 and above] in cucumber cotyledon extracts were stabilized by preparing the tissue homogenates in a phosphate buffered sol. containing 0·01 M Na diethyldithiocarbamate. The same sol.+0·005 M cysteine HCl was effective with prune dwarf virus (PDV) in squash leaf extracts. Since PDV from squash and cucumber could not be stabilized by Na diethyldithiocarbamate alone, it appears to be sensitive to some substance which did not affect NRSV or RNRSV and was distinct from the polyphenol oxidase system.

In the presence of suitable substrates polyphenol oxidase inactivated stable

extracts of PDV. Oxidized polyphenols inactivated PDV and NRSV, but reduced polyphenols did not, indicating that inactivation is caused by *o*-quinones formed by the enzymatic oxidation of polyphenols in the extracts.

Polyphenol oxidase activity was higher in infected than in healthy tissues. Spraying infected cucumber and squash cotyledons with an enzyme inhibitor (4-chlororesorcinol) increased the virus content whereas an enzyme substrate (catechol) reduced it.

ENGELBRECHT (D. J.) & VAN REGENMORTEL (M. H. V.). **Mechanical transmission of a ring spot virus from stone fruit trees.** —*S. Afr. J. agric. Sci.*, **3**, 4, pp. 617–624, 4 graphs, 1960. [Afrik., Fr. summ.]

At Stellenbosch a virus of the ring spot group was successfully transmitted from many stone fruit vars. to cucumber [cf. **36**, 332]. All the apricot and plum vars. grafted on Marianna plum rootstock tested, as well as most peach vars., proved to be infected. The addition of salicylic acid and de-inhibited rabbit serum prolonged the longevity of the virus.

LOCKHART (C. L.). **Diseases.**—*Progr. Rep. Dom. Blueberry Substa., N.B., 1954–1959*, pp. 13–15, 1961.

Some of this information has been noticed [**37**, 727]. In Charlotte County in 1956 87% of 39 fields of low-bush blueberry [*Vaccinium angustifolium*] were infected by *Monilinia* [*Sclerotinia*] *vaccinii-corymbosi* [**38**, 18] and 18% with *Botrytis cinerea* [**33**, 738]. Twig and blossom blight have increased 12% since 1952. *S. vaccinii-corymbosi* was unable to overwinter in diseased plants.

BASU (P. K.). **Verticillium disease of Strawberries.**—*Canad. J. Bot.*, **39**, 1, pp. 165–196, 1 pl. (6 fig.), 10 fig., 1961. [25 ref.]

The morphology, cultural characters, and pathogenicity to strawberry, tomato, and eggplant, of 18 *V.* isolates were compared at the Univ. Toronto, Ont. Virulence to strawberry [**35**, 307; **38**, 387] ranged from lethal to almost avirulent; strawberry plantings must therefore be arranged to avoid close contact with susceptible solanaceous hosts. However, it was demonstrated that current-year strawberry runners were immune from infection, and that overwintered, healthy plants did not carry latent infection even though susceptible. A technique was evolved for confirmatory diagnosis of *V.* on strawberry since the range of symptoms produced was so variable. Pieces of washed petiole, surface-sterilized in 1% Na hypochlorite for 10–15 min., were plated directly on to water agar, the method proving suitable also for isolations from all the hosts studied. Since the isolates intergraded as a whole they are regarded as a single, very variable sp., *V. alboatrum*.

STEYN (P. A. L.). **Strawberries in South Africa.**—*Bull. Dep. Agric. S. Afr.* 372, 26 pp., 12 fig., 1960.

The most important fungi noted in the sect. on diseases (pp. 17–19) are fruit rot (*Botrytis cinerea*), leaf spot (*Mycosphaerella fragariae*), and mildew (*Sphaerotheca humuli*). A number of virus diseases are of economic importance, including strawberry witches' broom, (severe) crinkle, [mild] yellow edge, and 'dwarf'.

STOVER (R. H.), HILDRETH (R. C.), & THORNTON (N. C.). **Studies on Fusarium wilt of Bananas. VII. Field control.**—*Canad. J. Bot.*, **39**, 1, pp. 197–206, 3 pl., 2 diag., 2 graphs, 1961.

In further studies in Honduras [cf. **40**, 318] the only consistent means of reducing *F. oxysporum* f. *cubense* on Gros Michel bananas was by flood fallowing [**35**, 308] and silting, which may be considered successful if 3–5 yr. economic production is obtained subsequently with only minor infection during the 1st 2 yr. This treatment

destroys the pathogen in the deep submerged soil but not in the surface layer, where the possibility of its further elimination by various soil treatments was examined. Of the experimental treatments described, namely various alternate floodings and ploughing or disking, with or without the subsequent addition of fungicides, the most successful was ploughing between each of 3 periods of flooding (3, 2, and 2 months) and vapam (the best of several chemicals tried) treatment at 50 gal./acre after the last flooding, which appears to be giving an economically useful life. Such treatments, however, will succeed only on soil inimical to rapid spread of the disease, i.e. where the build-up of disease before treatment had been comparatively slow. In addition, host plants should be removed some years before treatment so that the inoculum potential can fall. The usefulness of a grass- or crop-fallow after flooding remains to be determined. In one experiment subsequent planting with sorghum, which was then disked (at 30 tons green wt./acre) after 2 months, dried on the surface, and finally ploughed in had no additional effect on disease reduction.

Leach (R.). **Annual Report of the Banana Board Research Department, Jamaica, 1959.**—39 pp., 9 graphs, 1960.

The report of the plant pathologist (R. Leach; pp. 20–24) [cf. **39**, 432] notes that leaf spot [*Mycosphaerella musicola*] was controlled with less phytotoxicity than in the past by a new oil. In aerial spraying the boom type of equipment gave as good results as centrifugal atomisers, and under tall coconut palms control was effective, even on Lacatan, from fixed-wing aircraft. Spraying was carried out in the early morning, usually at 1 gal./acre, but half this amount was adequate on some irrigated, unshaded plantations. In a trial to determine if any relationship existed between nutritional status and oil phytotoxicity, flecking of the leaves [cf. **40**, 59] in low N plots in 1 test was significantly higher than in high N, but flecking was similar on plots receiving 3 levels of P and K. *M. musicola* produces mainly ascospores on Lacatan, whereas on Gros Michel it was the large nos. of waterborne conidia which produced sudden leaf spot outbreaks [cf. **40**, 179]. Where trash is used as mulch for young bananas oil spraying of Lacatan and Robusta plants should begin as soon as the 1st leaves open.

Trials with Schering's formulated Cu oxychloride and perenox applied with mechanical knapsack mist-sprayers showed that control was similar with both and satisfactory for most of the year but was inferior to that given by oil when conditions were more favourable for disease development. Both fungicides caused some leaf scorching where leaves received the direct blast from the machines.

The investigations by the assistant plant pathologist, D. S. Meredith, on *Gloeosporium musarum* have been noticed [**40**, 317].

Guérout (R.). **Le Cercospora au Cameroun : écologie et prévisions.** [Leaf spot in the French Cameroons: ecology and forecasting.]—*Fruits d'outre-mer*, **15**, 11, pp. 485–487, 4 graphs, 1960.

Local application during 1957–59 of methods developed in the French W. Indies for forecasting attacks [of *Mycosphaerella musicola*: **39**, 432] on bananas and of relating meteorological factors to leaf symptoms marking progressive stages of infection [**37**, 492] are briefly discussed. The methods proved very valuable and permitted the drawing up of a spray programme well in advance of an outbreak. It is considered, however, that a study of the natural development of the fungus in relation to precise meteorological data rather than of the damage caused by it will best enable an opt. spray schedule to be devised.

Beccari (F.), Cerri (P. G.), Fenili (G. A.), & Golato (C.). **Ricerche e prove di lotta contro le crittogame nocive al Banano. II. Prove applicative sull' azione di alcuni fungicidi sintetici et di un fungistatico antibiotico sulle degenerazioni**

patologiche dei tagli del rachide e dei traumi del regime di Banano dopo la raccolta. III. Prove orientative sull' azione in vitro contro il Gloeosporium musarum Cooke a Massee di alcuni preparati fungicidi di sintesi destinati alla prevenzione del marciume del rachide del regime di Banano. [Researches and tests on the control of fungi injurious to Banana. II. Tests of the effect of some synthetic fungicides and of a fungistatic antibiotic on the pathological rotting of stem pieces and banana bunches injured after picking. III. Preliminary tests on the effect *in vitro* on *G. musarum* of some synthetic fungicides intended to prevent stem-end rot of Banana.]—*Riv. Agric. subtrop.*, **54**, 10–12, pp. 752–762, 1 fig., 5 graphs; pp. 763–781, 5 pl. (25 fig.), 4 graphs, 1960. [Engl. summ.]

In the 1st paper [cf. **39**, 482] work at Genale, Somalia, is described which showed that the fungicides prinzon cos (Terpal Chemie, Germany) and basofix BM 117 (containing 10% polyethylene polysulphide and 2·5% F 3212 (organic Cu)) and the antibiotic mycostatin 20 [cf. **40**, 317] gave effective control of stem-end rot of banana caused by *G. musarum* if applied soon after harvest. Of the 3 substances mycostatin 20 was the least effective, probably because a dust was used; in future it will be diluted with latex 522.

In *in vitro* tests at the Istituto Agronomico per l'Oltremare, Florence, described in the 2nd paper, the fungicidal efficacy and the persistence of the effect on cultures of *G. musarum* of 0·1% omadine, 1% tecnazene, 1% quintozene, basofix BM 117, and 50% prinzon cos were greatest for basofix BM 117, closely followed by prinzon cos.

Mallik (P. C.) & Singh (D. L.). **Deficiency symptoms in Mango due to the absence of trace elements.**—*Indian J. Hort.*, **16**, 4, pp. 228–231, 1959. [*Biol. Abstr.*, **36**, 1, p. 223, 1961.]

When potted S.29 mango plants were grown without Mn, Zn, B, Cu, and Mg [cf. **38**, 269], singly, the leaves remained normal in the minus Mn and Mg, and were smallest with Zn deficiency, followed by B. Zn appears to be the most important element for growth.

Kubo (S.), Ukawa (S.), & Kamekura (S.). **Boron deficiency in Japanese Hop gardens.**—*Rep. Res. Lab. Kirin Brew. Co., Yokohama, 1959*, 2, pp. 1–10, 1959. [*J. Inst. Brew.*, N.S., **58**, 1, pp. 71–72, 1961.]

The symptoms of a troublesome disorder are described and illustrated by photographs. They include foliar distortion, cessation of development at the growing points, resulting in the formation of laterals which also cease to grow, weakness of bines and laterals preventing twining, short internodes, and poor xylem production. Fissures or dark green spots frequently appear on the lower part of the shoot, where the collenchyma, as well as in the affected growing points, shows abnormal cellular swelling and destruction. The rate of spread in the gardens is increased by dry conditions in the spring. The most susceptible age is 3–4 yr., and native Japanese, Saaz, and Hallertau vars. are more liable to suffer than Californian or Cluster. Conditions conducive to the trouble include shallow cultivation, poor supplies of stable or farmyard manure, and a subsoil of sand or gravel, or of volcanic or granitic origin.

A deficiency of available B was found to be responsible [cf. **33**, 631; **34**, 707] and healthy growth was restored by treatment with borax at 5–20 g./plant, spread on the ground but not directly on the plants. An excess of B decreases the resin content and the fragrance of the cones, necessitating analysis of the soils and fertilizers to raise the available B to 0·6–0·8 p.p.m. Since the B taken up by the plants is not returned to the soil, applications may need to be annual.

Brigham (R. D.). **Castorbean diseases in Texas in 1960.**—*Plant Dis. Reptr*, **45**, 2, pp. 124–125, 1 fig., 1961.

During 1960 a previously undescribed seedling disease, of unknown etiology, appeared during a warm, dry period in a planting of *Ricinus communis* var. Baker 296 near Plainview, Texas. Symptoms were first evident shortly after emergence as chlorosis and distortion of the cotyledons, accompanied by abnormal root formation and swelling of the hypocotyl, which generally cracked open. When the dry weather was followed by rain, affected seedlings recovered rapidly. The other pathogen of primary importance was *Alternaria ricini* [**39**, 31], causing losses of up to 35% in Baker 296 during 1960.

Dermelj (Vasilija). **Untersuchungen über Sphaceloma menthae Jenkins, den Erreger der Pfefferminzanthraknose.** [Studies on *S. menthae*, the agent of Peppermint anthracnose.]—*Phytopath. Z.*, **40**, 2, pp. 151–186, 9 fig., 2 graphs, 1960. [Engl. summ. 80 ref.]

A list of the *Sphaceloma* spp. with host plants and a review of the literature are given from the Inst. für Pflanzenschutz der Landwirtschaftlichen Hochschule, Hohenheim, Germany.

The symptoms of anthracnose (*S. menthae*) [cf. **31**, 351] 1st found in Yugoslavia in 1956, appear on all aerial parts of peppermint, but most intensively on the foliage and stem. On the leaves the oil-glands are destroyed, thereby significantly reducing the oil content. From comparative studies with the Ljubljana str. from Ljubljansko Barje and str. 487 from the Centraalbureau voor Schimmelcultures, Baarn, it was concluded that they are different morphological-physiological races.

Saturation of the atmosphere for up to 48 hr. at $> 15°$ C. was necessary for infection, which did not take place at 80% R.H. At 20° the incubation period is 8–10 days; at 16° 14. Lower temp. prolongs the incubation period. Inoculations on 14 *Mentha* spp. with both strs. caused infection on all. The fungus hibernates as mycelium in the fallen tissues of the aerial stolons. It can be successfully isolated in the spring from the peripheral zones of necrotic tissues from the previous yr. Isolations from dead stubble were negative. Of 5 fungicides tested, 0·2% ferbam and 1% vitigran (Cu oxychloride) gave the best results but the disease could not be completely suppressed. Analysis of leaves from healthy and infected plots showed that strong infection (about $\frac{1}{3}$ of each leaf) reduced the oil content by $\frac{1}{2}$, but treatment raised it again.

Taĭrova (Mme V. N.) (Editor). Картофель. [The Potato.]—407 pp., illus., Moscow, Sel'khozgiz, 1959. Roubles 6.95. (2nd, revised ed.)

A. I. Rovdo, in 'Peats—the best soils for improving the health of seed potato' (pp. 331–342), gives results of experiments on these soils, to which early vars. are best suited, and on response to diseases such as degeneration [**40**, 179], black leg [*Erwinia carotovora* var. *atroseptica*: **40**, 237], scab [*Streptomyces scabies*: **39**, 493], and *Rhizoctonia* [*Corticium solani*: loc. cit.]. L. V. Rozhalin, D. I. Fillipov, & Mme O. D. Belova report on 'New information on improving the seed qualities of the potato' (pp. 343–355), in which the overall N and starch content of tubers in relationship to different types of degeneration is considered. In 'Large-scale selection methods and their role in increasing seed quality and yield of the potato' (pp. 356–364) A. P. Kuchumov considers tuber selection for improved resistance to degeneration, *Phytophthora* [*infestans*: **40**, 181], and other diseases. In another paper by the same author 'New promising potato varieties of the Soviet selection' (pp. 365–382), these are listed with indications of reaction to various fungus diseases. S. M. Bukasov reports 'On virus diseases of the potato' (pp. 383–387).

Dwuraźna (Mme M.). **Zależność między zawartością skrobi w bulwach ziemniaków a warunkami klimatycznymi, glebowymi i zdrowotnością.** [Relation between starch content in Potato tubers and climatic, soil and health conditions.]—*Acta biol. cracov.*, **3**, pp. 47–59, 5 graphs, 1960. [Engl. summ.]

At the Virus Lab., Polish Acad. Sci., Cracow, analyses indicated that the starch content of virus-infected tubers was 1·85% lower than of healthy ones, and 1·3% lower in tubers grown in Cracow (lowlands) than in Zakopane (mountains) [cf. **40**, 423]. A 1° C. rise in the Sept. temp. increased the starch content at Cracow by 2·2% and at Zakopane by 2·33%.

Maj (Z.). **Oznaczanie glikoalkaloidów w kietkach Ziemniaka metodą hemolizy krwinek.** [Determination of glycoalkaloids in Potato sprouts by bloodcell haemolysis.]—*Acta biol. cracov.*, **3**, pp. 25–34, 1960. [Engl.]

At the Virus Lab., Polish Acad. Sci., Cracow, virus infection was found to exert no significant influence on the glycoalkaloid content of potato tubers, whereas tubers grown at high altitudes have a lower content than those grown on the plains, and the content is also affected by different climatic conditions.

Kollmer (G. F.) & Larson (R. H.). **Potato virus F in relation to host range, properties, reaction of American Potato varieties, and resistance.**—*Res. Bull. Wis. agric. Exp. Sta.* 223, 40 pp., 15 fig., 1960. [71 ref.]

Some of the information in this detailed study has been noticed [**40**, 180]. The host range of the 7 isolates of potato virus F [potato aucuba mosaic virus str.: **40**, 379] used was identical, though the symptoms varied in severity in some susceptible plants. All potato vars. tested were susceptible but some lines of *Solanum chacoense* were immune. Severe top necrosis was induced on several potato vars. only below 28° C. All isolates caused tuber necrosis. Some American potato seedlings were free from infection but every plant of the Dutch var. Albion tested was infected. Saco potato was protected by 2 of the less virulent isolates from infection by 3 more virulent strs. When either of 2 of the isolates was present in Samsun tobacco a synergistic effect occurred with any of 3 isolates of lucerne mosaic virus; the latter, together with cucumber mosaic virus, and potato virus Y failed to protect Early Callwonder pepper [*Capsicum* sp.] from infection by potato virus F.

Kristensen (H. R.). **Kartoffel Virus Y — en alvorlig sygdomsfremkalder.** [Potato virus Y—a serious cause of disease.]—Reprinted from *Ugeskr. Landm.*, **47**, 6 pp., 3 fig., 1960. [21 ref.]

Essential information on an increasingly important source of rejection of seed potatoes offered for certification in Denmark [**37**, 550] and elsewhere is presented under the headings of distribution of potato virus Y, reaction of infected vars., transmission of infection, diagnosis (by inoculation, serology, physical properties, particle shape and size, etc.), and control measures, breeding for resistance, elimination of sources of contamination, use of healthy seed, and aphid extermination.

Nohejl (J.). **Herstellung diagnostischer Sera gegen die Viren X, Y, S, und M bei Kartoffeln durch Immunisierung von Schöpsen und Pferden.** [Preparation of diagnostic sera against Potato viruses X, Y, S, and M by immunization of wethers and horses.]—*Za sots. sel.-khoz. Nauk* (*J. čsl. Acad. agric. Sci.*), **9**, 6, pp. 579–594, 2 fig., 1960. [Russ. summ.]

This paper from Potato Res. Inst., Havlíčkův Brod, Czechoslovakia, is an expansion of one already noticed [**39**, 608].

Black leg of Potatoes.—*Adv. Leafl. Min. Agric. Lond.* 107, 3 pp., 1 fig., 1961.

A revised leaflet dealing briefly with the symptoms, spread, and control of potato

black leg (*Pectobacterium carotovorum* var. *atrosepticum*) [*Erwinia carotovora* var. *atroseptica*: cf. **39**, 617].

Logsdon (C. E.). **Antibiotics and Potato ring rot in Alaska.**—*Amer. Potato J.*, **38**, 1, pp. 1–5, 1961. [13 ref.]

The incidence of *Corynebacterium sepedonicum* at the Alaska agric. Exp. Sta., Palmer, was reduced by seed treatment with agrimycin 100 (with or without 1% glycerol) and terramycin, but the only effective control was afforded by the former [cf. **37**, 737] at uneconomic rates (5,000 p.p.m.), which were also somewhat phytotoxic. Amimycin and bacitracin were quite ineffective.

Harrison (D. E.) & Downie (W. A.). **Phoma and dry rot of Potatoes. Progress report on investigations in Victoria.**—*J. Agric. Vict.*, **58**, 6, pp. 372–373, 375–377, 379–381, 385, 1 fig., 1 graph, 1960.

Experimental investigations into potato storage rots (*P. foveata* [cf. **38**, 767] and *Fusarium* spp., including *F. caeruleum*, *F. sambucinum*, and, possibly, *F. trichothecioides* [cf. **38**, 30]) showed that control can be obtained by preventing damage to the tubers. If the tubers are damaged, they should be kept at 65–85° F. for a week before storing at normal temp. Seed potatoes should be dipped for 10 min. after digging in acid $HgCl_2$ (4 oz.—1 qt. commercial HCl/25 gal. water) or 6% organic Hg (clerit) 1:400. Dusting with 3% tecnazene (1 lb./100 tubers) gave promising results. In var. resistance trials at Ballarat the most resistant var. was V 7 8 with 18·5% total damage, followed by Menominee (23·4%) and V 28/11 (26·3%). At Healesville Kennebec was the most resistant (1·8% storage rot), followed by V 7 8 (5·7%). Sequoia, Sebago, and Exton, which occupy 95% of the acreage planted with potatoes in Victoria, were very susceptible.

Callbeck (L. C.). **Screening of Potato fungicides in 1960.**—*Canad. Pl. Dis. Surv.*, **40**, 2, pp. 56–58, 1960.

In these tests, the results of which are tabulated, 14 fungicides were screened against *Phytophthora infestans* at Charlottetown, P.E.I., [cf. **40**, 321]. The Cu fungicides were the least effective.

Dionne (L. A.) & Lawrence (C. N.). **Early scab resistant derivatives of Solanum chacoense × Solanum phureja.**—*Amer. Potato J.*, **38**, 1, pp. 6–8, 1 fig., 1961.

These have been obtained at the Canada Dept Agric., Fredericton, N.B. The mechanism of inheritance of resistance to *Streptomyces scabies* [**38**, 224] is complex. In the 1st stages of transferring resistance to commercial potatoes tetraploid clones of the hybrids were obtained by treatment with colchicine.

Vavilova (Mme M. A.). Устойчивость Картофеля к склеротинии. [Resistance in Potato to *Sclerotinia sclerotiorum*.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 1, pp. 53–54, 1961.

At the Polar exp. Sta. All-Union Inst. Plant Cultivation, Khibiny, U.S.S.R., hybrids between potato and the series *Acaulia* [*Solanum acaule*], *S. curtilobum*, and *S. demissum* were notably more resistant than potato vars. or intervarietal hybrids.

Hildebrand (E. M.). **Relations between whitefly and Sweetpotato tissue in transmission of yellow dwarf virus.**—*Science*, **133**, 3448, pp. 282–284, 2 fig., 1961.

Adults were the only stage of the whitefly *Trialeurodes abutilonea*, a new vector of the virus [**40**, 322], observed in the field at Beltsville, Md, in late June each year since 1957, pupae being the overwintering stage. Microscopy revealed that when the crawler (or 1st larval stage) comes to rest and inserts its stylet into feeding position on the underside of a sweet potato leaf, the legs cease to function and are shed with the skin during metamorphosis. When 3 or more adults were transferred

from the location of their pupal cases on a diseased plant to a new feeding site on a healthy one, transmission was obtained (less than 20%) when the virus-carrying adults survived a day or longer after transfer. The stylet was found to terminate at a cell in the translocation stream.

MAERTENS (C.). **Efficacité et rendement économique d'un traitement contre les pourridiés de l'Hévéa.** [The effectiveness and economic return of the control of root rots of *Hevea* Rubber.]—*Bull. agric. Congo belge*, **51**, 4, pp. 845–884, 19 fig., 2 diag., 6 graphs, 1960.

The standard treatment to control the root rots caused by *Fomes lignosus* and *Armillaria mellea* [cf. **35**, 925; *et passim*], involving removal of infected tissue and use of a fungicidal paint, as used at Yangambi, Congo, is described and the diagnosis of the disease and practical application of the remedy are discussed. From an experimental study it is concluded that the treatment is effective, but economic only in an area of high potential infection.

RIGGENBACH (A.). **On Fomes lignosus (Klotzsch.) Bres. the causative agent of the white root disease of the Para Rubber tree, Hevea brasiliensis Muell.-Arg.**—*Phytopath. Z.*, **40**, 2, pp. 187–212, 1 fig., 1960. [Germ. summ. 70 ref.]

In further studies [cf. **36**, 717] at the Rubber Res. Inst. of Ceylon, Dartonfield, Agalawatta, Knop solution was found to be most satisfactory as a basic medium for all liquid cultures of *F. lignosus* [**40**, 244]. The fungus is able to grow on a great variety of organic materials [cf. **40**, 62] provided they are not fully decomposed and still contain essential vitamins. It can synthesize only 1 component, thiazole, of thiamine. It is able to decompose and utilize certain celluloses, such as methylcellulose, also soluble starch and gallic and tannic acids, and pectin (60% esterified apple pectin), utilizing it as a sole C source, but not oxalic, malonic, succinic, maleic or fumaric acids.

TOWNSEND (C. H. T.). **Progress in developing superior Hevea clones in Brazil.**—*Econ. Bot.*, **14**, 3, pp. 189–196, 1960.

Blight-resistant but low-yielding jungle specimens of *Hevea* rubber plants [cf. **38**, 623] in the breeding collection at Belterra, Brazil, were crossed with high-yielding Far Eastern specimens susceptible to leaf blight (*Dothidella ulei*). Over 130,000 cross-pollination progenies were tested for resistance, of which over 10,000 were budded for observation. After 2 years many back- and outcrosses came into production. These clones consisted mostly of F_1 selections back- or outcrossed to high-yielding Eastern parents; they should produce superior blight-resistant plants for commercial use, some giving higher yields.

Diseases.—*Rep. Hawaiian Sug. Exp. Sta., 1960*, pp. 22–27, 7 fig., 1960.

This report [cf. **39**, 497] (Oct. 1959–Sept. 1960) indicates some control of pineapple disease (*Ceratocystis paradoxa*) of sugarcane in laboratory tests with osamine, phenyl mercury oleate, and phenyl mercury naphthenate. In the greenhouse Hercules 3944 and 4223 gave satisfactory control of *Pythium graminicola*; weekly applications at 200 p.p.m. to seedling flats appear to be necessary to secure effective control; Olin Matheison's 1564 also gave promising results when used as a drench (500 p.p.m.) weekly. Dexon (formerly Bayer 22555) also gave control, but proved too expensive for field use; some infection occurred in captan-treated flats. The new soil fumigants trapex (EP-161) and EP-162 (Morton Chemical Co.) gave promising results against *P. graminicola* in pots.

Nitrites appeared to be more toxic to sugarcane in acid than in other soils. Large amounts of nitrite (160 p.p.m. NO_2–N or more) were required to cause visible injury to 37–1933 and 50–7209 canes.

Chattopadhyay (S. B.) & Sarkar (A.). **Strains of Colletotrichum falcatum Went in West Bengal.**—*Indian J. mycol. Res.*, **3** (*1957*), 1–2, pp. 24–28, [1960].

In cultural studies at the State agric. Res. Inst., W. Bengal, isolates of *C. falcatum* [*Glomerella tucumanensis*: **40**, 183] were divided into 6 distinct morphological groups, the characteristics of which are tabulated. In pathogenicity tests on vars. Co. 313, Co. 419, and Co. 453, the isolates, all of the 'light race', showed 3 distinct degrees of virulence, 1 str. being notably virulent.

Agnihothrudu (V.) & Barua (G. C. S.). **Notes on fungi from North East India. VI. Xylobotryum andinum Pat. on Tea (Camellia sinensis (L.) O. Kuntze).**—*Sydowia*, **14**, 1–6, pp. 136–137, 1 pl., 1960.

The collars of tea bushes growing in waterlogged soils in N.E. India are frequently covered by fructifications of *X. andinum*, a new record for the E. hemisphere. The pathogenic potentiality of the fungus, hitherto mistaken for *Sphaerostilbe repens*, is to be investigated at Tocklai Exp. Sta., Assam.

Elias (A. L.). **Motorized knapsack mistblowers.**—*Tea Quart.*, **31**, 4, pp. 169–171, 1960.

In spraying experiments with 5 types of shoulder-mounted mistblowers against blister blight [*Exobasidium vexans*: **39**, 735; **40**, 323] of tea on the St. Coomb estate, Ceylon, from May–Aug. 1960 the machines gave as good control with 4–6 oz. Cu fungicide 2 gal. water acre as conventional knapsack sprayers using 15 gal. water/acre, and at a cost of 1·15 Rs acre compared with 1·80 Rs for knapsack sprayers.

Agnihothrudu (V.). **Rhizosphere microflora of Tea (Camellia sinensis (L.) O. Kunze) in relation to the root rot caused by Ustulina zonata (Lév.) Sacc.**—*Soil Sci.*, **91**, 2, pp. 133–137, 1 graph, 1961.

At Tocklai Exp. Sta., Indian Tea Ass., Cinnamara, Assam, the rhizospheres of tea infected by charcoal stump rot (*U. zonata*) [**40**, 184] yielded significantly larger quantities of micro-organisms than those of apparently healthy plants or soil at a distance from the roots, the numbers of fungus spp. at the 3 sites being 50, 32, and 14, respectively. Among the spp. present at the 1st but absent from the other 2 were *Absidia spinosa*, *Cunninghamella bertholletiae*, *Neocosmospora vasinfecta*, *Aspergillus sydowi*, *A. unguis*, *Fusarium semitectum*, *Alternaria humicola*, and *Stysanus stemonitis*.

Schmelzer (K.), Bartels (R.), & Klinkowski (M.). **Interferenzen zwischen den Viren der Tabakätzmosaik-Gruppe.** [Interference between viruses of the Tobacco etch mosaic group.]—*Phytopath. Z.*, **40**, 1, pp. 52–74, 10 fig., 1960. [Engl. summ.]

At Inst. für Phytopathologie, Aschersleben, Germany, primary inoculations of the severe str. of tobacco etch virus (TEV) [**39**, 623] did not protect Samsun tobacco against subsequent inoculation with various tobacco vein necrosis (VN) strs. or normal strs. of potato virus Y (NY). In the newly formed leaves the 2nd virus was easily detectable by differential hosts and serological tests and its conc. was lower than in pure cultures, and sometimes than that of TEV too.

Plants given NY second produced no supplementary symptoms, but VN strs. were clearly detectable externally in addition to TEV. On plants of *Physalis floridana* 1st infected with TEV the local lesions and systemic necroses of secondarily applied NY were clearly visible, though corresponding plants infected by Y alone were more severely damaged. *Hyoscyamus* [henbane] mosaic virus (HMV) was also not protected by TEV but only reduced in conc., that of TEV being reduced also.

Potato virus A could establish itself in the presence of TEV in *Solanum demissum* hybrid 'A 6', *P. floridana*, and Samsun tobacco. Inoculation of *P. floridana* with HMV did not protect against later infections with NY, though HMV reduced the severity of Y damage. HMV conc. in expressed sap from plants infected 1st with Y was as high as in the controls.

VN str. 'M3' did not protect Samsun tobacco against virus Y strs.; it even failed to show any cross protection against VN str. 'Wi'. With Wi before M 3, evidence of cross protection was more or less distinct.

The necrotic fleck str. of Y, of S. American origin, gave no complete protection against Y III, but *P. floridana* plants with Wi or VN Lü A showed no symptoms when Y III followed.

Mixed infections (in pairs) of Samsun tobacco or *Nicotiana glutinosa* indicated that the etch strs. cannot be fully suppressed by TEV and that with HMV, too, the effect of both partners was generally detectable, while with potato virus A symptoms were determined exclusively by the other component.

The findings of Bawden and Kassanis [**24**, 401], which are not in agreement with the above, are discussed.

Silva (D. M.) & Knight (C. A.). **Peptic digests of the 1-peptide fractions of five strains of Tobacco mosaic virus.**—*Virology*, **12**, 4, pp. 589–595, 1 fig., 1960.

At Calif. Univ., Berkeley, the peptide spots obtained by a combination of paper electrophoresis and paper chromatography of the Holmes's ribgrass str. of tobacco mosaic virus [**36**, 132] differed markedly from those of 4 other TMV strs.

Sarkar (S.). **Interaction and mixed aggregation of proteins from Tobacco mosaic virus strains.**—*Z. Naturf.*, **15** B, 12, pp. 778–786, 4 diag., 1 graph, 1960.

At the Max-Planck Institut für Biologie, Tübingen, Germany, proteins from the common, yellow, Dahlem, and rib-grass strs. of TMV were examined electrophoretically, singly and in pairs, at various pH levels.

In weakly alkaline media an av. of 6 polypeptide chains of virus protein remain in association, while constant dissociation and reassociation proceeds. To this dynamic state of equilibrium are attributed the transient reciprocal associations of proteins or polypeptide chains from the 3 1st-named strs. Lowering the pH resulted in the formation by these interacting proteins of aggregates with intermediate mobilities. Protein from the rib-grass str., tested against common mosaic, neither interacted in alkaline media nor formed mixed aggregates at lower pH values.

Hirai (T.) & Shimomura (T.). **The mode of action of some antibiotics in their inhibitory effect on Tobacco mosaic virus multiplication.**—*Phytopath. Z.*, **40**, 1, pp. 35–44, 6 graphs, 1960. [26 ref. Germ. summ.]

In further studies at Fac. Agric., Nagoya Univ., Anzyo, Japan [cf. **39**, 348], mitomycin C inhibited TMV production in tobacco leaf tissues most effectively at 25 p.p.m. Naramycin (an actidione analogue) and its derivatives (acetate, oxime, and semicarbazone) produced similar inhibition at fairly low conc.

Furumoto (W.) & Wildman (S. G.). **A kinetic investigation of the mode of TMV attachment to infectible sites.**—Abs. in *Phytopathology*, **51**, 1, p. 65, 1961.

Twice as many lesions of tobacco mosaic virus developed on a *Nicotiana glutinosa* leaf rubbed directly with a TMV suspension than when it was rubbed and then immersed in the suspension. Numbers were further decreased by extending the time between rubbing and dipping. The rate of loss of susceptibility was independent of the conc. of TMV, though actual infection of the susceptible cells is dependent on conc. and period of immersion. It is suggested that the virus is adsorbed on to the susceptible cells.

Sukhov (K. S.). Стабилизация кристаллов вируса Табачной мозаики, извлеченных из клеток антивирусной сывороткой. [The stabilization of Tobacco mosaic virus crystals extracted from cells by antiviral serum.]—Воп. Вирусол. [*Vop. Virusol.*], **4**, 6, pp. 741–742, 5 fig., 1959.

At the Inst. Genetics, Acad. Sci. U.S.S.R., Moscow, it was established that the hexagonal crystals of TMV can be preserved for a few days when the tissue of infected leaves is macerated in antiviral serum. The antibodies react with the virus particles of the crystal and stabilize the surface. Antibodies also have a stabilizing effect on the needle-shaped paracrystal inclusions, from which it can be concluded that their basic mass is made up of virus particles. Stabilization of virus crystals and paracrystals is also possible in a dilute antiserum over a wide pH range. The antiserum used had a titre of over 1:10,000 and gave high stabilization at a dilution of 1:250.

Richter (J.) & Klinkowski (M.). **Das Tabakmosaikvirus (TMV) — Modellobjekt der pflanzlichen Virusforschung. (Sammelreferat.)** [Tobacco mosaic virus (TMV)—model object of plant virus research. (Symposium.)]—*Zbl. Bakt.*, Abt. 2, **113**, 22–25, pp. 700–765, 4 fig., 3 diag., 3 graphs, 1960.

This comprehensive survey comprises an introduction, sections dealing with studies on numerous aspects of the virus *in vitro* and *in vivo*, and a 12-page bibliography.

Völk (J.). **Beobachtungen zur Ausbreitung des Tabakrippenbräunestammes des Y-Virus im Freiland.** [Observations on the spread of the Tobacco vein necrosis strain of virus Y in the field.]—*Zbl. Bakt.*, Abt. 2, **113**, 22–25, pp. 687–699, 10 graphs, 1960.

The results of further studies at the Inst. für landwirtschaftliche Virusforschung, Brunswick, Germany, demonstrated the dependence of the extent and rapidity of infestation of tobacco plots by this virus [**39**, 437] on the annual situation in respect of the aphid vectors, *Myzus persicae*, *Macrosiphum solanifolii* [*M. euphorbiae*], *Doralis* [*Aphis*] *rhamni*, and *D.* [*A.*] *frangulae*. Commencement of their activity before the beginning of June results in mass infection by potato virus Y at an early stage in the growth of the tobacco crop. The course of infection for the separate sections of the observation period (1954–59) is discussed and compared with the aphid position in the individual years, especially the last 2.

Mitskovski (J.). **Application of vapam for disinfection of the soil in Tobacco seed-beds.**—*Duvan*, **10**, 1, pp. 1–13, 1960. [*Tob. Abstr.*, **5**, 1, pp. 31–32, 1961. Serbo-Croat., Engl. summ.]

In Yugoslavia treatment with 1% vapam (10 l./sq. m.) 20 days before sowing completely eliminated black root rot [*Thielaviopsis basicola*: **40**, 384], increasing the number of healthy plants 2½ times, besides augmenting width, height, and weight. Because of the simplicity of application (no seed-bed cover being necessary) the fungicide should be particularly useful in co-operative organizations.

Ternovskiĭ (M. F.). Наследственность и изменчивость иммунитета межвидовых гибридов **Nicotiana.** [Heredity and variability of immunity in interspecific *Nicotiana* hybrids.]—*Ex* Наследственность и Изменчивость Растений, Животных и Микроорганизмов [Heredity and variability of plants, animals and micro-organisms], **2**, Moscow, Acad. Sci. U.S.S.R., pp. 640–645, 1959. [Abs. in *Referat., Zh. Biol., 1960,* 20, p. 36, 1960.]

In studies at the Krasnodar exp. plot, All-Union Tobacco and Makhorka Inst., and at the Alma-Ata State farm, hybrids from the wild immune *N. glutinosa* were mostly used, in the majority of which the dominance of immunity introduced from

the wild species was established. The amphidiploids *N. glutinosa*×*N. tabacum* were relatively constant and resistant to powdery mildew [*Erysiphe cichoracearum*: **39**, 243] and tobacco mosaic virus [**39**, 501]. Only the F_1 was relatively constant in crosses between amphidiploids and tobacco. In subsequent generations variation of immunity by family was detected, but constant forms were bred. The tobacco vars. produced were resistant to *E. cichoracearum* and TMV.

Drechsler (C.). **A Pythium causing stem rot of Tobacco in Nicaragua and Indonesia.**—*Sydowia*, **14**, 1–6, pp. 4–20, 14 pl., 1960. [18 ref.]

An isolate from brown tissue of a tobacco plant with a destructive stem rot in Nicaragua in Aug. 1954 [cf. **36**, 683] was found to be similar to one from tobacco in Sumatra in 1927 [**6**, 759] and another later isolation from there [**13**, 599]. It was compared with *P. indicum*, *P. indigoferae* and *P. butleri* and is being referred to as *Pythium* sp. (cf. *P. indicum*) [**27**, 572].

Kiryukhina (Mme R. I.) & Lalichich (I.). Опасное заболевание Табака — пероноспороз. [Peronosporosis—a dangerous disease of Tobacco.]

Kryachko (Z. F.) & Vitukevich (É. R.). Меры против ложномучнистой росы Табака. [Control of Tobacco false mildew.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **6**, 1, pp. 48–49, 3 fig., 1961.

This note from the Central Quarantine Lab. records the occurrence of *Peronospora tabacina* [cf. **40**, 324] in the Transcarpathian area of the U.S.S.R. (along the Czechoslovak and Hungarian frontier), after its appearance in 1960 in Czechoslovakia, Hungary, and Yugoslavia [map 23]. Seed treatment with granosan and fumigation of hothouses with benzene or paradichlorbenzene vapours are recommended for prevention. Young infected seedlings should be sprayed with zineb, fermate-ferbam, the new carbamate compounds, or cuprous oxide—cotton oil, and field crops should be harvested prematurely if attacked slightly, or destroyed if attacked severely, with subsequent 30 cm. deep tillage.

The 2nd paper from the State Inspection Plant Quarantine Service notes the measures taken by the Ukrainian Min. Agric., including among others inspection of suspected sites (2,678 ha.) and an injunction to establish new tobacco stands not less than 1–1·5 km. apart from the infected tracts. Crop rotation for 3–4 yr. is also recommended.

Heursel (J.) & De Baets (A.). **Gezondheidstoestand en ontsmetting van Tabakzaad.** [Health conditions and disinfection of Tobacco seeds.]—*Verh. Rijkssta. PlZiekt., Gent*, 9, 16 pp., 3 fig., 1961. [Fr., Engl., Germ. summ. Cyclostyled.]

Tests failed to show transmission of *Peronospora tabacina* by seed from infected plants, though 1960 seed proved to be seriously infected by *Alternaria longipes* [map 63]. Only wet seed disinfectants gave satisfactory control, the best being 0·5% $AgNO_3$, 5 min. immersion, calcium hypochlorite (1 hr.), ethyl alcohol (5 min.), and 0·1% ceresan wet (30 min.).

News and notes. Blue mould of Tobacco in Europe.—*F.A.O. Plant Prot. Bull.*, **9**, 1, pp. 15–16, 1960.

In an attempt to control tobacco blue mould (*Peronospora tabacina*) in Europe [see above] the Co-operation Center for Scientific Research Relative to Tobacco (CORESTA), at a meeting in Lausanne on 5–6 Oct. 1960, decided to request all countries concerned to destroy all tobacco crop residues by 1 Dec. and forbid any tobacco cultivation, experimental or otherwise, until the next growing season. Special provision was made for other *Nicotiana* spp. used in experiments. Losses from the disease in 7 European countries in 1960 are tabulated.

Crowley (N. C.) & Hanson (J. B.). **The infection of apical meristems of Tomato roots with Tobacco mosaic virus after treatment with ethylenediaminetetra-acetic acid.**—*Virology*, **12**, 4, pp. 603–606, 1 graph, 1960.

At the Waite agric. Res. Inst., Adelaide, S. Australia, the meristematic cells of roots of tomato seedlings, inoculated with TMV while growing in a nutrient medium containing EDTA contained a much higher conc. of the virus than mature tissue [cf. **38**, 314].

Tomato leaf mould.—*Adv. Leafl. Minist. Agric. Fish., Lond.* 263, 4 pp., 1 fig. 1960.

This amended leaflet deals with the occurrence and control of *Cladosporium fulvum* on glasshouse tomatoes, with a note on the resistant vars. Antimold B and Sapsford's No. 1.

Youssef (Y. A.). **Antagonistic action of Penicillium chrysogenum in the control of Tomato Fusarium wilt.**—*Phytopath. Z.*, **40**, 2, pp. 218–220, 1 fig., 1960. [Germ. summ.]

P. chrysogenum from garden soil inhibited *Fusarium oxysporum* [cf. **36**, 629] on Czapek-Dox agar plates at the Dept Bot., A'in Shams Univ., Cairo. Dilutions of 10, 40, and 70% of a crude filtrate from broth cultures of *P. chrysogenum* inhibited *F. oxysporum* in liquid Czapek-Dox. Symptoms of *F.* wilt were inhibited in highly susceptible tomato plants treated with *P. chrysogenum* cultures or filtrates.

Felix (S.). **Some studies on a disease of Tomato new to Mauritius.**—*Rev. agric. sucr. Maurice*, **39**, 6, pp. 353–356, 4 fig., 1960.

During the summer, 1960, an epidemic of *Stemphylium solani* [**39**, 373], a study of which is presented, caused up to 100% infection under favourable conditions. Losses depended on the time of infection and the prevailing temp. The disease was absent from fields given regular preventive sprays of zineb (2 lb./100 gal.) or 3 parts Cu oxychloride+1 part zineb (3 lb./100 gal.).

Krüger (W.). **The influence of antibiotics on the germination of Tomato seed and development of the seedlings.**—*S. Afr. J. agric. Sci.*, **3**, 4, pp. 561–571, 1960. [Afrik., Fr. summ.]

At Coll. Agric. and Exp. Sta., Potchefstroom [cf. **40**, 339], 11 antibiotics tested were toxic only at high concs., especially crude streptomycin and oxytetracycline. The antibiotics penetrated the seed coat but not measurably the embryo. Occasionally traces of those in the streptomycin, oxytetracycline, novobiacine, and bacitracin series could be found in seedlings but only in those grown from paper-germinated seed. Consequently seed treatment is not likely to give protection against bacteria during early development stages in the seed bed.

Berry (C. R.) & Thompson (G. E.). **Extension of range and a new host for Cristulariella pyramidalis.**—*Plant Dis. Reptr*, **45**, 2, p. 152, 1961.

C. pyramidalis [**27**, 395] caused premature defoliation of *Acer platanoides* in Asheville, N. Carol., in Oct. 1960.

Freier (R. v.). **Schleimflußkrankheit an Birke und anderen Holzarten.** [Slime flow disease of Birch and other tree species.]—*Forst u. Holz*, **16**, 2, pp. 55–56, 2 fig., 1961.

In recent years a slime flow disease has been reported on beeches in Germany. Attention is now drawn to a similar condition of sand birches in the Göttingen

forest district. Brown spots of exuding sap appear on the stem cortex, underlying which is a red layer of bast, often with minute grey dots and an odour of fermentation. In a few trees blisters the size of the palm of the hand between the apparently healthy cortex and the bast contained reddish, sticky sap which spurted out on pricking. The inner bast was apparently sound. The disease is irregularly distributed both on single trees in mixed stands and in avenues on all types of soil throughout the area. A similar exudation from an aspen, a maple [*Acer*], and an oak has been reported from the Bentheim district.

Kraft (M. M.). **Contribution à l'étude des commensaux d'Endothia parasitica (Murr.) Anders. sur châtaignier, au Tessin.** [Contribution to the study of commensals of *Endothia parasitica* on Chestnut in Ticino.]—*Sydowia*, **14**, 1–6, pp. 337–340, 1960.

The fungi isolated from 20 wood samples from 10 chestnut trees infected by *E. parasitica* during Oct. 1959 at Monte-Ceneri, Switzerland, included *Phycomyces nitens*, *Phellinus* [*Polyporus*] *dryadeus*, *Polyporus sulphureus*, and *Fusarium roseum*. They were not present in similar samples from healthy trees. *Physalospora cydoniae* was obtained from healthy samples only. Trees infected by *Armillaria mellea* appeared to be less readily attacked by *E. parasitica*.

Purnell (Helen). **'Collar-rot' or 'dead-eye' of Eucalyptus spp.**—*For. Tech. Pap., Melbourne*, 2, pp. 12–15, 1959. [Cyclostyled. Received 1961.]

Armillaria mellea is the cause of this disease in Victoria, to which 6 *E.* spp. [listed] and *Acacia melanoxylon* are susceptible [cf. **39**, 509]. The disease is confined to trees growing between 2,000–3,500 ft. in the 30–40 in. annual rainfall area, occurs in patches of 2 3 acres in which both dead and living infected trees are found, and was 1st reported in 1954 though probably present before. The recent increase is associated with a series of very wet years.

Oak leaves hold key to fungus spread.—ex *Rep. Wis. agric. Exp. Sta., 1958*, p. 10, 1959. [*For. Abstr.*, **21**, 4, p. 612, 1960.]

Experiments demonstrated that oak leaves become resistant to *Cronartium quercuum* as they mature, leaves 4–11 days old being highly susceptible and those > 25 days old completely resistant. Infection requires, further, a period of 12 hr. at R.H. 100% and free moisture on the leaves. Applications in the pine (*Pinus banksiana*) [**39**, 251] nursery of zineb, ferbam, and ziram gave, respectively, 84, 80, and 75% control.

Urošević (B.). **Mykoflora žaludů v období dozrávání, sběru a skladování.** [The mycoflora of acorns in the period of ripening, harvest, and storage.]—*Práce výzk. Úst. lesn. ČSR, 1961*, 21, pp. 81–203, 30 pl. (115 fig.), 1961. [Russ., Engl. summ. 4 pp. ref.]

This paper from For. Res. Inst., Zbraslav-Strnady, Czechoslovakia, contains a review of previous studies; a list of fungi (99 spp.) identified by the author arranged systematically with descriptions; a list of fungi (203) hitherto recorded on acorns [cf. **39**, 629]; directions for assessing health and disease in acorns; a short identification key for diseases of oak; and notes on treatment of acorn diseases. Of the pathogenic fungi the Ascomycetes were of greater economic importance than the Phycomycetes, and they included in particular *Sclerotinia pseudotuberosa*, *S. sclerotiorum*, *Diaporthe insularis* (*Phomopsis quercella*), *Valsa intermedia*, and *Gnomonia quercina* (*Gloeosporium quercinum*).

Dos Santos de Azevedo (Natalina F.). **Micorrizas de Quercus suber L. Parte II. Inoculação de viveiros de Quercineas.** [Mycorrhiza of *Quercus suber*. Part

II. Inoculation of Oak nurseries.]—*Publ. Dir. Serv. flor. aquic., Lisboa*, **24**, 2, pp. 183–220, 4 pl. (16 fig.), 1957. [Engl. summ. Received Dec. 1960.]

In further studies over 5 yr. [cf. **32**, 497] experimental nurseries were established for the production of mycorrhiza-inoculated material where reafforestation with 2 *Q.* spp. from seed had failed. The soil of several plots was treated with inoculated Indore compost and in these growth was greater and healthier. Of 3 processes tried, soil inoculum was found the most economic. Ectotrophic mycorrhiza of the types A, B, and Dn [loc. cit.] with white, yellow, and black mantles developed; they were identical with (*a*) those found in the soil used as inoculum, and (*b*) those commonly found in the soil of all cork oak groves.

Bier (J. E.). **The relation of bark moisture to the development of canker diseases caused by native, facultative parasites. IV. Pathogenicity studies of Cryptodiaporthe salicella (Fr.) Petrak, and Fusarium lateritium Nees., on Populus trichocarpa Torrey and Gray, P. 'robusta', P. tremuloides Michx., and Salix sp. V. Rooting behaviour and disease vulnerability in cuttings of Populus trichocarpa Torrey and Gray, and P. 'robusta'.** —*Canad. J. Bot.*, **39**, 1, pp. 139–144, 1 pl. (9 fig.); pp. 145–154, 2 pl. (6 fig.), 1 fig., 3 graphs, 1961.

In this further contribution from Univ. B.C. [cf. **39**, 444] *C. salicella* (previously referred to *C. salicina*) is reported to attack only *Salix* sp. and *F. lateritium* [*Gibberella lateritia*] only *P. trichocarpa* in the field. When both these pathogens were inoculated to cuttings of *P. trichocarpa*, *P. 'robusta'*, *P. tremuloides*, and *Salix* which were allowed to dry gradually, cankers developed when the rel. turgidity of the dormant bark was < 80%. These results indicate that the host ranges of some facultative parasites may be greater than is thought, and that, for example, *C. salicella* may attack trees other than *Salix* when the vigour of the host is reduced to the level of susceptibility. It is necessary to carry out pathogenicity tests on trees during the dormant period when defence reactions are at a minimum, and field exposure of dormant cuttings may indicate potential canker diseases.

There was a correlation between the amount of vigour, expressed by the production of basal callus and wound roots, and the rel. turgidity of the bark in cuttings from 1-yr.-old shoots of *P. trichocarpa* and *P. 'robusta'*. When bark turgidity fell below 80% the ability of cuttings to produce basal callus decreased and many were killed by *G. lateritia* and *Cytospora chrysosperma* [*Valsa sordida*]. Highly significant correlations were found between weight, bark moisture, and basal callus of *P. 'robusta'* cuttings and wound root production, so that wt. determinations would provide an indication of the vigour of dormant nursery stock.

Dahte (A.). **Vorbeugung gegen Dothichiza-befall der Baumschulpflanzen durch Chemikalienspritzung.** [Preventing *Dothichiza* attack on nursery plants with chemical sprays.] —*Holzzentralbl.*, **86**, 67, p. 934, 1960. [*For. Abstr.*, **21**, 4, p. 611, 1960.]

Four sprayings during July–Sept. with 0·3% brestan, 0·75% cupravit blau, or 0·3% kupferoxydul ultra gave good control of *D.* [*populea*] [**40**, 252] on *Populus* × *robusta* plants; the following spring at least 90% were free from infection, as against only 8% of the untreated.

Moriondo (F.). **Un singolare attacco di Armillaria sp. su Robinia pseudoacacia.** [An exceptional attack of *A.* sp. on *R. pseudoacacia*.]—5 pp., 2 pl. (8 fig.), Florence, Tipografia B. Coppini & C., 1958. [Fr. summ. 6 ref. Received Feb. 1961.]

An account is given of a very severe attack by *Armillaria* sp. (probably *A. mellea*) on *R. pseudoacacia* [cf. **36**, 291] in the province of Udine, Italy. Some 7,000 sq. m.

are affected and the outbreak spreads every yr. by 2,000 sq. m. No trees have yet died. The 1st symptom is a swelling in the trunk near the collar. The fungus spreads upwards and downwards in the wood; the tree reacts vigorously by laying down cork barriers through which the fungus passes, a state of equilibrium eventually being set up between host and parasite.

Roll-Hansen (F.). **Melding on sykdommer på skogtrærne i Norge i året 1959.** [Report on diseases of forest trees in Norway in the year 1959.]—*Medd. Skogsforsøksv.*, **16**, 5, pp. 339–349, 1960. [Engl. summ.]

Among the less familiar pathogens reported was *Discella strobilina* in the pycnidial state on dead Norway spruce (*Picea abies*) shoots, which may have been the cause of their destruction. It was also found on dead tops of nursery pines (*Pinus contorta*), on neighbouring stands of which was *Lophodermium pinastri*, also responsible for severe injury to *P. sylvestris* in another region.

Perithecia and pycnidia of *Scleroderris lagerbergii* [**40**, 254] were found on spruce leaders, but there was no evidence of pathogenicity, though the fungus killed *P. sylvestris* shoots in a nursery provenance plot and damaged a plantation of *P. mugo*.

Damping-off of nursery spruces was attributed to *Fusarium* cf. *oxysporum*. Very heavy losses of Norway and Sitka spruces (*Picea sitchensis*) were caused by an unidentified mycelium resembling that of *Herpotrichia juniperi*, which was particularly virulent in a moist climate with a deep layer of snow on unfrozen soil.

Special conditions are presumed to have favoured parasitic action by *Sclerophoma pithyophila* [cf. **37**, 189, 685; **39**, 741], involving some 10% of nursery spruces.

Cronartium flaccidum killed 20–30% of a young stand of *Pinus sylvestris* [**30**, 202].

The fruit bodies of *Poria obliqua*, an important agent of white rot of birch [cf. **39**, 628], were found in Telemark during the period.

Physiogenic disorders included an extensive die-back in 2 30-yr.-old spruce stands, possibly caused by frost, and Mn deficiency of the same sp. in a nursery.

Wilson (C. L.). **An undescribed blight disease of Arizona Cypress.**—*Plant Dis. Reptr*, **45**, 2, pp. 96–98, 1961.

At the Dept Plant Path., Univ. Ark., Fayetteville, *Cercospora thujina* [**24**, 298] (which Chupp [**33**, 635] refers to *Heterosporium*) was isolated from *Cupressus arizonica* with a blight, first evident on the inner, lower branches and progressing until 2–3-yr.-old trees were killed within 1 yr. Isolates of the fungus reproduced the disease on healthy cypress cuttings and also on *Thuja orientalis*. *Exosporium glomerulosum* [**40**, 131] was also found associated with some of the diseased tissues examined, but not further investigated.

Hodges (C. S.) & Green (H. J.). **Survival in the plantation of Eastern Redcedar seedlings infected with Phomopsis blight in the nursery.**—*Plant Dis. Reptr*, **45**, 2, pp. 134–136, 1 fig., 1961.

At the U.S. Dept Agric. Forest Exp. Sta., Asheville, N. Carol., *Juniperus virginiana* seedlings with 10% *P. juniperovora* infection [**40**, 193] had a survival rate of only 30% 2 yr. after planting out, mainly because of reinfection of previously diseased seedlings. Viable conidia were obtained from branches dead for 2 yr.

Padgett (W. H.). **Fungi associated with diseased Pine seedlings in Alabama forest nurseries.**—*J. Ala. Acad. Sci.*, **30**, 2, pp. 8–9, 1958.

In surveys during 1957 *Sclerotium bataticola* [*Macrophomina phaseoli*] and *Fusarium*

spp. were isolated from 5 *Pinus* spp., *Chaetomium* sp. and *Penicillium* spp. from 3, *Rhizoctonia* sp. from 2, and *Pullularia* sp. from 1. To date, only *Rhizoctonia* has been shown to be pathogenic in inoculations of pine seedlings.

Robinson (R. C.). **Blue stain of bark-beetle-infested Lodgepole Pine.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **17**, 1, pp. 3–4, 1961.

Since it was shown that infestations of mountain pine beetle (*Dendroctonus monticolae*) on lodgepole pines [*Pinus contorta* var. *latifolia*] were accompanied by a blue sapwood stain beetles were collected from caged, infested trees and placed on plates of malt agar. The stain fungus *Ceratocystis montia* and 2 yeasts were invariably isolated from the beetles [**20**. 551] and occasionally a *Leptographium* sp. The observations made suggest that a complex of fungi is involved in blue stain of lodgepole pine, and that bark beetles act as vectors.

Gremmen (J.). **Naaldhout afsterving door Rhizina undulata in het bijzonder na takken-branden op kaalslagen.** [A die-back of conifers caused by *R. inflata*, particularly after slash burning.]—*Korte Meded., Sticht. BosbouwProefsta. 'De Dorschkamp'* 45, pp. 5–10, 2 fig., 1 plan, 1961. [Engl. summ.]

The author discusses group-dying of older trees [**38**, 430] in the light of the rapid spread of the pathogen in a 55-yr.-old stand of Austrian pine [*Pinus nigra*]. *Rhizina* attack in young plantations, encouraged by the rise in soil temp. due to slash burning after clear felling may be serious, and it is recommended that such burning should be stopped and the organic material hauled into heaped rows instead.

Kailidis (D. S.) & Strong (F. C.). **Damping-off of Black Pine, Pinus nigra, Arn.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **43**, 1, pp. 14–32, 1960. [21 ref.]

Information in greater detail of work noticed [**39**, 746].

Schwarzkiefernsterben in Niederösterreich. [Black Pine die-back in Lower Austria.]—*Holz-Kurier, Wien*, **15**, 14, pp. 1–2; 17, p. 9, 1960. [*For. Abstr.*, **21**, 4, p. 610, 1960.]

Owing to attack by *Brunchorstia pinea* [cf. **34**, 324] it is estimated that about one-sixth of the black pine will have to be felled. The outbreak, accompanied by reddening or yellowing of the needles and shoot die-back, is attributed to the wet, later hot dry, summer of 1959.

Pomerleau (R.). **On the effects of White Pine blister rust in a plantation.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **17**, 1, p. 1, 1961.

In natural white pine [*Pinus strobus*] stands in Quebec 30 yr. ago [**11**, 553] less than 3·5% were attacked by blister rust [*Cronartium ribicola*: **40**, 438] and no extensive damage has been reported since but on re-afforested land incidence is much more severe.

In 1958–60 10% of the trees in a plantation started in 1943 were attacked each yr. and 7–8% killed. The number of trees with at least 1 trunk canker increases annually by 11–12%, and trees may have up to 5 trunk and 10 branch cankers. Most of the stand will probably be killed in the next 8–10 yr. or sooner.

Climate, elevation, airflow influence blister rust spread.—ex *Rep. Wis. agric. Exp. Sta., 1958*, pp. 38–39, [1959. *For. Abstr.*, **21**, 4, pp. 611–612, 1960.]

Cankers caused by *Cronartium ribicola* [**40**, 193] grafted on disease-free nursery stock of *Pinus strobus* tended to die out if the trees were kept at a const. temp. of 82° F., whereas those grafted on to trees maintained at 75, 68, or 61° lived on. Site elevation appeared to have some connexion with the distribution of the disease in

S. Wis. At elevations under 900 ft. virtually no rust was present on pine; at 900–1,000 ft. it occurred only where there was local cooling, whereas at over 1,200 ft. it appeared on all sites. The av. Aug. daily max. temp. decreased by 0·75° for each 100 ft. of elevation. Smoke bombs were used to study air currents and the transport of spores from *Ribes* to pine.

Root rots.—ex. *Rep. northeast. For. Exp. Sta., New Haven, 1959*, pp. 45–48, 1960. [*For. Abstr.*, **21**, 4, p. 609, 1960.]

Observations of the rate of spread of *Fomes annosus* in 2 severely infected centres, 8 and 10 yr. old, in a *Pinus resinosa* plantation, threw some doubt on the view that localized spread does not occur unless woody material is continuously present in the soil. The fungus was abundant and fruiting on the litter surface in 1 plot.

Gremmen (J.). **Biologie en bestrijding van de wortelzwam Fomes annosus (Fr.) Cooke.** [Biology and control of the root fungus *F. annosus*.]—*Korte Meded. Sticht. Bosbouw Proefsta. 'De Dorschkamp'* 44, pp. 394–409, 6 fig., 1960. [Engl. summ. 20 ref.]

An account of the appearance and behaviour of the fungus in the Netherlands [**18**, 74], where it is serious on conifers.

Wallis (G. W.). **Infection of Scots Pine roots by Fomes annosus.**—*Canad. J. Bot.*, **39**, 1, pp. 109–121, 1961.

Further information is given from the Bot. School, Univ. Cambridge [cf. **40**, 190, 439]. Blocks from beech branches, 3–4 cm. diam. and 4–6 cm. long, were autoclaved for 2 periods of 60 min. with an interval of 24 hr., inoculated with *F. annosus*, and incubated at 22° C. for 4 months, by which time the pathogen had penetrated the wood. Pine roots 1–3 cm. diam. and at a depth of 15–20 cm. in a 20-yr.-old plantation on soil of pH 7–7·3 were uncovered and inoculated with (i) intact blocks or (ii) blocks with a strip of bark removed placed on the roots and surrounded with polythene; or 1 end of the block was placed against the root and covered (iii) or not (iv), or (v) injured roots with the wood exposed were inoculated as in (iii). The roots were re-covered with the original soil. After 7 months over half the roots had well established infection and 20% of the inoculated roots (with the exception of those in (i)) had succumbed to the disease. The mean max. mycelial growth in roots which had died was 26 cm., and 3 cm. in those remaining viable. The highest no. of infections occurred with method (iv). Nearly 50% of the roots of suppressed trees died during the experiment, but only 1 of 9 in dominant trees. Where the mycelium was well established the wood had become impregnated with resin.

In an experiment to determine the food base requirements of the pathogen and the opt. size of beech blocks to obtain infection, 9 of 10 roots died after 7 months with inoculum blocks weighing 10 gm. and 7 of 10 with 30 g. blocks, but only 50% became infected with 100 gm. blocks. Of 21 small blocks, 17 contained no *F. annosus* at the end of the experiment and had been colonized by other organisms. This replacement occurred more frequently in acid than in alkaline environments.

Field and laboratory studies indicated that *F. annosus* spores were unable to infect uninjured pine roots. In experiments with severed pine roots sprayed with basidiospores infection occurred in only 2 of 225 unsterilized roots with intact bark, but on the other hand mycelium penetrated the bark and invaded the wood of most surface-sterilized roots. No infection was obtained with intact roots sprayed with basidiospores. Spore germination occurred on 14 of 24 injured roots after 10 weeks and 9 of 36 after 12 months. It is thus unlikely that *F. annosus* spreads to roots

by means of spores. It is possible that lack of sufficient nutrients in the outer bark is responsible for the failure of spores to produce infections, but this needs further investigation.

Levisohn (Ida). **Root forking of Pine seedlings growing under non-sterile conditions.**—*New Phytol.*, **59**, 3, pp. 326–331, 1 pl. (4 fig.), 1960.

Further pot culture studies at Bedford Coll., London [cf. **31**, 347], demonstrated that, without establishing an association, the mycorrhiza-formers *Boletus bovinus*, *B. granulatus*, *Mycelium radicis nigrostrigosum* [cf. **35**, 797], and *Rhizopogon luteolus* could induce short-root forking in actively growing pine seedlings. A number of soil fungi which are not common root associates failed to induce dichotomous root-branching, though certain other as yet unidentified mycelia can apparently do so. Tryptophane caused root-forking in pines in water cultures.

Two types of forking appear to occur in both infected and uninfected roots, one connected with mycorrhiza-formers and the other developing under the influence of non-mycorrhizal fungi or induced by various growth substances.

Due (J. E.). **Om Trametes, planteafstand og hugst ved 1. generation Rødgran på let jord.** [*Trametes*, plant spacing and thinning of first-generation Norway Spruce on light soil.]—*Dansk Skovforen. Tidsskr.*, **45**, 3, pp. 125–139, 1960. [*For. Abstr.*, **21**, 4, p. 608, 1960.]

In Danish forestry 'Trametes' has recently been used for various fungi, chiefly *Fomes annosus* [see below], *Armillaria mellea*, and *Polyporus albidus* and a tree is described as 'Trametes-attacked' whenever staining and wood destruction occur. Data are presented showing a decrease in 'Trametes' attack with increasing plant spacing in the range 1·25×1·25, 4·5×1, and 8×1 m.

Mańka (K.). **O grzybie korzeniowym Mycelium radicis atrovirens Melin.** [On the root fungus *M. r. atrovirens*.]—*Monogr. bot., Warsz.*, **10**, 2, pp. 147–158, 4 pl. (20 fig.), 1960. [Germ. summ. 12 ref.]

In further studies [cf. **37**, 606] by Zakład Fitopatologii leśnej WSR, Poznań, Poland, *M. r. atrovirens* [cf. **38**, 715] was easily isolated from spruce roots and was also found on pine and oak roots. It was most common in the mycorrhiza of spruce rootlets up to 1 mm. thick, less so in those 1–3 mm., and rare in thicker roots of the humus layer, to which it was chiefly confined. Opt. temp. for growth was 20° C. and opt. pH 4. Some isolates stimulated the development of the rhizomorphs of certain strs. of *Armillaria mellea*. Its effect on the host is thought to be normally favourable.

Due (J. E.) & Yde-Andersen (A.). **Lærkeammetræer og Fomes annosus-angreb i Gran.** [Larch nurse trees and *F. annosus* infection in Spruce.]—*Dansk Skovforen. Tidsskr.*, **45**, pp. 566–579, 4 fig., 1 graph, 1960. [Engl. summ.]

This is a tabulated report and discussion of a comparative study in the autumn of 1960 on the development of *F. annosus* in spruce stands [**39**, 198] planted with and without Japanese larch nurse trees in the Løvenholm forest area, Denmark. A statistically higher incidence (40·4%) occurred in the stands with nurse trees than without (13·1). The severe attack is attributed to the early felling of the nurse trees (mostly from 1946 to 1950). Since infection probably spreads by means of airborne spores from the larch stumps to the standing spruces, the former should be treated with creosote immediately after felling [**39**, 251].

Ch'en (S.-C.). **Preliminary study on white heart rot of Picea spp. in the Hsiao-chin (Siaokin) river basin.**—*For. Sci., Peking*, **2**, pp. 132–149, 1960. [*For. Abstr.*, **21**, 4, p. 609, 1960.]

Incidence of infection by *Fomes pini* var. *abietis* on spruce varies from 10·6–29·7%;

the height and diam. increment of affected trees declines, and the yields av. only 25·4% that of sound tree vol. The youngest trees infected are 115 yr. old. Infection is spreading at the higher altitudes and on shady slopes. *P. asperata* is more resistant than *P. purpurea*.

Bakshi (B. K.), Singh (B.), & Rehill (P. S.). **Coniophora cerebella Pers., a dry rot fungus on building timber in India.**—*Indian J. mycol. Res.*, **3** (*1957*), 1–2, pp. 51–53, 1 pl. (4 fig.), 1 fig., 1960.

A description of *C. cerebella* [*C. puteana*] collected from a rest house in the Chakrata Forest, Uttar Pradesh, in Oct. 1957, a new record for India. Details are given of the sporophore and cultural characters of the isolate, which was studied at the For. Res. Inst., Dehra Dun.

Bakshi (B. K.), Puri (Y. N.), Singh (S.), & Sharma (R. P.). **A note on decay resistance of Teak, Shisham and Khair.**—*Indian For.*, **87**, 1, pp. 40–41, 1961.

From experiments at Dehra Dun the authors conclude that the 3 timbers are resistant in ascending order; that the outer heartwood of khair [*Acacia catechu*: **37**, 378] is less resistant than that of the others; that this is not influenced by the height at which the samples were taken; and that the sapwood of shisham [*Dalbergia sissoo*: **37**, 117] and the sapwood and inner heart of teak have low resistance. Test blocks are classified 1–4 in descending order of resistance, this being based on weight-loss from fungus activity in quantities of 5, 15, 25, and more than 25%, respectively. The test fungi used were *Daedalia flavida* [**39**, 640], *Ganoderma lucidum*, *Polyporus anebus*, and *Polystictus versicolor*.

Banerjee (S.) & Samadder (K. R.). **Studies on decays of felled timber II. A rot of Sal caused by Daedalea flavida Lév.**—*Indian J. mycol. Res.*, **3** (*1957*), 1–2, pp. 1–23, 6 pl. (30 fig.), 1 fig., [1960. 23 ref.]

Both heartwood and sapwood of *Shorea robusta* logs are attacked by *D. flavida* [**37**, 708 and above] under favourable conditions of temp. and R.H. Detailed macroscopic and microscopic descriptions are given of the progress of the rot and of studies at the Dept Bot., Univ. Calcutta, on the primary and secondary mycelia of the fungus. The results of laboratory tests with wood preservative on sal blocks are fully tabulated, also microchemical studies on chemical changes in the wood during decay.

Banerjee (S.) & Purkayastha (R. P.). **Studies on Irpex flavus Kl. 1. Antagonism between different strains and their host-relations.**—*Indian J. mycol. Res.*, **3** (*1957*), (1–2), pp. 40–50, 2 pl. (10 fig.), 2 graphs, 1960.

Mycelia of *I. flavus* from *Shorea robusta*, *Swietenia mahagoni*, and *Albizzia lebbek* were mutually antagonistic in paired culture at the Dept Bot., Univ. Calcutta. *A. lebbek* was the most susceptible and *S. robusta* the most resistant in decay studies with sapwood test blocks.

Shaltÿko (G. E.) & Pshedetskaya (Mme L. I.). **The fungicidal properties of shale tar.**

Shaltÿko (G. E.). **The increase of fungicidal properties of shale tar by chlorination.** — *Zh. prikl. Khim., Leningr.*, **33**, 1, pp. 212–215; 5, pp. 1229–1232, 1960. [Russ. *Abstr. Bull. Inst. Pap. Chem.*, **31**, 3, Nos. 1474, 1475, 1960.]

Impregnation of over 1,000 wood samples with acetone and benzene solutions of shale tar gave a low degree of protection against *Coniophora cerebella* [*C. puteana*: **39**, 446] and *Merulius lacrymans*.

The resistance of wood samples impregnated with solutions of chlorinated shale

tar (fraction boiling at 275–320° C.) was higher by a factor of 2–5 than that of similar samples treated with non-chlorinated liquid.

Jacquiot (M. C.), Breuzard (Mme M.), Guillemain (Mme J.), & Lapetite (Mlle D.). **Sur les possibilités d'emploi de l'acide borique et des borates pour la protection des bois.** [On the possibilities of using boric acid and borates for wood preservation.]—*Rev. Path. vég.*, **39**, 4, pp. 181–195, 6 fig., 1960. [Engl. summ. 24 ref.]

At the Centre technique du Bois, Paris, 0·2% boric acid [cf. **39**, 640] in dry wood prevented attack by *Coriolus* [*Polystictus*] *versicolor* and *Trametes* [*Lenzites*] *trabea*. The inhibition threshold for *Gyrophana* [*Merulius*] *lacrymans* was under 0·37%. However, determinations of the B content of wood before and after testing showed that even without leaching < 80% of the preservative diffused away through the mycelium in 4 months. B compounds appear to be unsuitable for wood preservation in exposed places: even in buildings at least 1% conc. should be used. B compounds gave unsatisfactory results against *Ceratostomella* sp. causing blue stain of *Pseudotsuga taxifolia*; even a conc. of 20% pentaborate and a 45 sec. soak did not give complete protection.

Englerth (G. H.). **Service life of some Puerto Rican post species tested with ten per cent pentachlorophenol by cold soaking.**—*Caribbean For.*, **21**, 1–2, pp. 38–40, 1960.

In 1951 263 posts, 2–4 in. diam. × 4 ft. long, representing 57 spp., were treated at Trop. For. Res. Cent. by immersion [cf. **36**, 626] for 120 hr. in 10% pentachlorophenol in diesel oil at ca. 75° F. After 8 yr. exposure at Cambalache (sea level, mean temp. 78°, rainfall 60 in., soil sandy) or at Toro Negro (2,700 ft., 70°, 110 in., heavy, badly drained clay) fungus decay was responsible for all failures and most deterioration. At Cambalache the posts of 11 spp. were found to have a service life of more than 8 yr., at Toro Negro only 3 spp.; for *Cordia sulcata* this was, respectively, 9·7 and 10·9 yr., for *Ficus laevigata* 10·5 yr. at both places. Assuming an av. service life of 2 yr. untreated, the data show that cold soaking can add 3–10 yr. to effective use of suitable spp.

Blew (J. O.) & Kulp (J. W.). **Comparison of wood preservatives in Mississippi post study. (1961 Progress Report.)**—*Rep. For. Prod. Lab., Madison*, 1757 (revised), 13+3 [unnumbered] pp., 1 fig., 1961.

The annual reports on the long-term trials of preservatives on posts of southern yellow pine [*Pinus palustris*: cf. **38**, 108].

Swan (H. S. D.). **The mineral nutrition of Canadian pulp species.**—*Pulp Pap. (Mag.) Can.*, **61**, 4, pp. 186, 188, 190, 192, 1 fig., 1 diag., 4 graphs, 1960.

A description is given of a study of N, P, K, and Mg deficiencies on the growth and development of white and black spruce (*Picea glauca* and *P. mariana*), jack pine (*Pinus banksiana*), and western hemlock (*Tsuga heterophylla*) at the Woodlands Res. Dept, Pulp Pap. Res. Inst. Can.

The specific mineral deficiencies resulted in recognizable, more or less clearly defined, visual symptoms, which should, however, be corroborated by analytical methods. The opt. level for P appeared to lie between 0·2 and 62 p.p.m. (the latter conc. resulting in depression of growth in all 4 spp.) and may be near 6·2 p.p.m. (0·3%). Data for the other elements are shown graphically. Attention is drawn to the rapid response of jack pine to deficiencies. Mention is also made of the 'hidden hunger' situation, in which a mineral deficiency causes growth depression but is not sufficiently severe to induce visual symptoms. It was illustrated in these experiments by the wt. reduction in black spruce and jack pine inadequately provided with K and N, respectively.

Chambers (S. C.) & Hardie (M.). **Sclerotinia rot of vegetables.**—*J. Agric. W. Aust.*, **2** (4th ser.), 1, pp. 41–43, 6 fig., 1961.

S. sclerotiorum has recently increased in severity to become one of the most important market garden pathogens in W. Aust., attacking particularly autumn-planted beans [*Phaseolus vulgaris*], cauliflower, and lettuce. Recommended control measures include burial of sclerotia by trenching [**40**, 446], wider spacing of plants and rows, and dusting with quintozene (30 lb./acre).

Jonge Poerink (H.). **Rand in witte kool.** [Tipburn in White Cabbage.]—*Meded. Proefst. Groenteteelt* 19, 63 pp., 9 fig., 19 graphs, 1961. [Germ., Engl., summ. 26 ref.]

Internal tipburn in white cabbage [cf. **40**, 389] causing great loss, is not to be attributed to fungi, bacteria, or viruses, according to these observations from the northern Netherlands, and application of minor elements had no beneficial effect. High N dressings often cause an increase, as does application of ditch bottom mud, harvesting at a very mature stage, wider planting, or even temporary storage after harvest.

Săvulescu (O[lga]). **Mana și albumeala Conopidei și combaterea lor.** [Mildew and white blister of Cauliflower and their control.]—*Comun. Bot., București, 1957–1959*, pp. 263–267, 4 fig., 1960. [Russ., Fr. summ.]

A description from Fac. științe naturale of *Cystopus candidus* var. *globosus* f. *intermedius* [*Albugo candida*] and *Peronospora brassicae* [*P. parasitica*] on cauliflower, severe on crops grown for seed at Țigănești near Bucharest in 1958. Control included, *inter alia*, an application of P and K fertilizers (70–100 kg. ha.) to increase resistance and of 1% Bordeaux mixture with adhesive.

Willey (L. A.), Davies (H.), & Morgan (W.). **Resistance of varieties of Swede to club root.**—*Plant Path.*, **10**, 1, pp. 28–31, 1961.

In 1953–55 136 British vars. of swede were grown in observation plots at Regional Trials Centres of the Nat. Inst. agric. Bot. Each yr. there was a moderately severe attack of *Plasmodiophora brassicae* [cf. **39**, 513] at Trawscoed, Cardiganshire, and in 1956–58 14 of the vars. were selected for detailed trials there. The results of these trials are tabulated. Infection was heavy in 1956 and 1957, but negligible in 1958. Vars. apparently resistant were Coxton Crofter (7–11% infection, 0–4% roots with large galls), Drummonds Disease Resisting (3–4, 0–0·5), and Wilhelmsburger (4–14, 0·6–4).

Klisiewicz (J. M.). **Studies on control of black rot of crucifers with antibiotics.**—*Diss. Abstr.*, **21**, 3, pp. 417–418, 1960.

Some of this work on *Xanthomonas campestris* has been noticed [**40**, 195]. In experiments connected with the development of a critical assay of seed infection incidence was highest in seedlings at 28° C. with a 24-hr. photoperiod; soaking infected seed for 2–12 hr. before sowing and exposure in a moisture chamber after emergence increased infection. Injury caused by the tetracyclines was reduced by soaking treated seed for 30 min. in 0·25 M monobasic Na or K phosphate; $CaCl_2$ reduced streptomycin injury but also affected its activity. Antibiotics were adsorbed on the testa but not detected internally.

Bennett (C. W.). **Sugar Beet yellows disease in the United States.**—*Tech. Bull. U.S. Dep. Agric.* 1218, 63 pp., 8 fig., 1960. [61 ref.]

A comprehensive account of beet yellows virus, its origin, geographical distribution, host range, symptoms, economic importance, transmission, properties, strs., vector

relationships, effects on the plant, and control measures. Experimental results obtained from studies in Calif. [**39**, 256, 518] are tabulated.

Van Steyvoort (L.). **La jaunisse de la Betterave. Résultats des essais sur insecticides systémiques effectués en Belgique de 1956 à 1959.** [Beet yellows. Results of tests on systemic insecticides performed in Belgium 1956–59.]—*Publ. tech. Inst. belge Amélior. Better.*, **28**, 2, pp. 65–113, 1960. [Flem., Engl. summ.]

It is concluded from this comprehensive report that trials with systemic insecticides, e.g. systox, metasystox, and ekatine, in plots (min. 1 are) with sufficient replications permit a ready estimation of the value and economic justification of treatments in areas heavily infested by beet yellows virus [**39**, 644]. The reduction of losses from the disease is more noticeable in severe epiphytotics and especially in seasons of massive multiplication by *Myzus persicae*. On the other hand, in regions of milder infestation experiments must be continued for several years before conclusions can be drawn. The merits of the 3 insecticides have already been demonstrated and their use is recommended on the basis of a single treatment where the level of infection reaches 20–40% and 2 applications where it is 40–50% or more.

Janas (Janina). **Straty spowodowane przez choroby wirusowe.** [Losses due to virus diseases.]—*Gaz. cukrown.*, **61**, 5, pp. 163–164, 1959. [Abs. in *Referat. Zh. Biol.*, *1960*, 20, p. 175, 1960.]

In a survey in 1958 of 436 sugar beet plantations in the Bydgószcz province, Poland, beet leaf curl virus [cf. **38**, 436] was found in 50% and beet yellows virus [cf. **38**, 170] in 42%.

Yarwood (C. E.), Resconich (E. C.), Ark (P. A.), Schlegel (D. E.), & Smith (K. M.). **So-called Beet latent virus is a bacterium.**—*Plant Dis. Reptr*, **45**, 2, pp. 85–89, 6 fig., 1961.

Attempts at the Dept Plant Path., Univ. Calif., Berkeley, and the Virus Res. Unit, Cambridge, England, to isolate and purify beet latent virus [**31**, 157; **38**, 469] were unsuccessful. Local lesions and systemic infections were, however, produced in cowpeas inoculated mechanically with sap from beets with symptoms. Isolations from these cowpea leaves yielded a bacterium, probably *Pseudomonas aptata* [**40**, 195]. When cowpeas were inoculated with pure cultures of the bacterium the virus-like symptoms were reproduced. Other evidence, which is described, supports the view that the disease is in fact due to a bacterium.

Byford (W. J.). **Seed dressings : an important development.**—*Brit. Sug. Beet Rev.*, **29**, 3, pp. 119–120, 122, 2 fig., 1961.

Three seed firms now have apparatus to provide beet seed treated with ethyl mercury phosphate against *Phoma* [*Pleospora*] *betae* [**39**, 201], as the treatment is difficult for application by individuals.

Palti (J.) & Lavee (Y.). **Ha-ḳemaḥon be-Afunah.** [Powdery mildew of Pea.]—*Hassadeh*, **40**, 8, p. 956, 1 fig., 1960. [Heb. From author's summ.]

Leaves, stalks, and pods of peas and occasionally of broad beans are affected by powdery mildew (*Oidium* sp.] in all parts of Israel (report from agric. Res. Sta., Rehovot). Cleistothecia have not been found on pea in Israel. Yield losses of peas grown for green pods or seed are considerable but slight with field peas grown for hay or silage. Initial symptoms take 6–7 weeks to develop in crops sown in Sept. or Feb., but in Oct.–Jan. sowings they do not develop for 8–9 weeks. Dusting with S gives effective control.

Deverall (B. J.). **Phenolase and pectic enzyme activity in the chocolate spot disease of Beans.**—*Nature, Lond.*, **189**, 4761, p. 311, 1961.

Experiments at Imperial Coll., Univ. London, suggested that an interaction between the polygalacturonase systems of *Botrytis fabae* and the phenolase system in broad beans results in the formation of the typical chocolate spots. The fungal enzymes kill the host cells [**34**, 667] and liberate the phenolase system and pectic substances which activate the host phenolase at pH 4–5. Then follows the oxidation of host phenols and formation of dark brown polymers which inactivate the fungal polygalacturonase. This mechanism would account for the small size of the lesions and for their tissues remaining coherent.

Wetter (C.), Paul (H. L.), Brandes (J.), & Quantz (L.). **Vergleich zwischen Eigenschaften des echten Ackerbohnenmosaik-Virus und des Broad Bean mottle-Virus.** [Comparison between the properties of Broad Bean true mosaic virus and Broad Bean mottle virus.]—*Z. Naturf.*, **15** b, 7, pp. 444–447, 1 fig., 2 graphs, 1960. [Engl. summ.]

Determined by spectrophotometric or chemical methods, or both, the nucleic acid contents of the 2 viruses were 32 and 23%, respectively, in further studies at Inst. für Virusserologie und landwirtschaftliche Virusforschung, Brunswick [**39**, 139]. Serologically the 2 viruses were unrelated, reacting with their homologous antisera only in reciprocal tests. The particle diam. of true mosaic was 25 mμ and that of mottle 20 mμ. Other differences were in the thermal inactivation points (66–75 and 95° C. in 10 min.), seed transmissibility by the former but not by the latter, host range, and symptomatology. Hosts of both viruses were white lupin, *Melilotus albus*, bean (*Phaseolus vulgaris*) var. Genfer Markt, pea vars. Foli, Salzmünder Edelperle, and Unica, crimson clover, and field bean (*Vicia faba* var. *minor*), whereas *Medicago lupulina* and red and white clover were attacked only by mottle. In further tests mottle was transmitted to *Coronilla varia* and *Lourea vespertilionis*, and true mosaic to *Crotalaria spectabilis*. True mosaic induced severe foliar mottling and crinkle on peas, but no local necroses such as are associated with mottle.

Clauss (E.). **Die phenolischen Inhaltsstoffe der Samenschalen von Pisum sativum L. und ihre Bedeutung für die Resistenz gegen die Erreger der Fußkrankheit.** [The phenolic constituents of the testas of Peas and their importance for resistance to the agents of foot rot.]—*Naturwissenschaften*, **61**, 4, p. 106, 1 graph, 1961.

The findings of Ewing [**39**, 521] formed the starting point of these studies at the Institut für Pflanzenzüchtung, Quedlinburg, Germany.

The testas of variegated-flowered vars. contained up to more than 10% phenolic substances, principally leuco-anthocyanins. Close biosynthetic relations were shown to exist between the substances in the testa and those in the flowers of 90 vars.

Tests of the phenolic substances for fungistatic activity, using Sörgel's method [**32**, 229], showed that the high degree of resistance to foot rot (*Ascochyta pisi*, *Mycosphaerella pinodes*, and *A. pinodella*) in the variegated vars. is attributable primarily to the high leuco-anthocyanin content of the seed coats. Thus, the addition of leuco-delphinidin (diluted to 1:1,000) isolated from flowers to a 2% testa decoction of the highly susceptible var. Kelvedon Wonder caused strong inhibition of pycnidial production and mycelial growth, the number of pycnidia after 144 hr. being only 5·5% of that in the untreated.

Besides leuco-anthocyanins the testas of the variegated vars. contained a number of other phenolic constituents, also present in the white-flowered. Studies are now

in progress to determine their possible significance in relation to the different grades of susceptibility within the latter group.

PALTI (J.). **Maḥalot ha-ḳishyoniya be-giddule shalḥin.** [Sclerotinia diseases of irrigated crops.]—*Hassadeh*, **40**, 4, pp. 450–451, 1 fig., 1960. [Heb. From author's summ.]

Symptoms are described from the agric. Res. Sta., Rehovot, Israel, of dry collar and stem rots common in eggplant and tomato, and to a lesser extent in groundnut and safflower, and of soft rots of eggplant and tomato fruits, leaf bases and heads of lettuce and cauliflower, leaf bases and stems of carrots and berseem [*Trifolium alexandrinum*], and of roots of carrot and beet. The pathogens are *Sclerotinia sclerotiorum* and *S. minor*: both occur on light, heavy, and calcareous soils, the former with a preference for calcareous and the latter more abundant on light soils. So far only *S. sclerotiorum* has been detected on loess. It is limited to the period Dec.–May while *S. minor* sometimes attacks also during the summer. A table is given classifying all irrigated crops according to their susceptibility to *Sclerotinia* diseases in Israel, for guidance in planning crop rotation. Cotton stems persisting in the field after ploughing may act as substrate for *S. sclerotiorum*, and endanger susceptible subsequent crops.

JOHNSON (H. W.). **Registration of Soybean varieties, VII.**—*Agron. J.*, **52**, 11, pp. 659–660, 1960.

Hill (Reg. No. 29), which originated in a co-operative programme of the Miss. agric. Exp. Sta. and the U.S. Regional Soybean Lab., is superior to Dorman in seed yield, resistance to the foliar diseases bacterial pustule [*Xanthomonas phaseoli* var. *sojense*: cf. **35**, 652; **36**, 633], wildfire [*Pseudomonas tabacum*: cf. **35**, 652], and frog eye [*Cercospora sojina*: **38**, 289], purple seed stain [*C. kikuchii*: cf. **36**, 569], and lodging. Merit (Reg. No. 32), developed at the Central Experimental Farm, Ottawa, is resistant to *Phytophthora* rot [*P. megasperma* var. *sojae*: **39**, 523]. Hood (Reg. No. 30) is superior to Ogden agronomically and in its resistance to leaf diseases.

KURATA (H.). **Studies on the fungal diseases of Soybean in Japan.** –*Bull. nat. Inst. agric. Sci., Tokyo*, Ser. C, 12, pp. 1–154, 30 pl., 1960. [Jap. 539 ref. Abs. from Engl. summ. (10 pp.).]

Following a review of soybean diseases, 1890–1955, the author describes his studies since 1948. Detailed cultural and physiological investigations are reported on target spot (*Corynespora cassiicola*), scab (*Sphaceloma glycines*) [**39**, 364], one of the most serious diseases of the crop in Japan; and wilt (*Fusarium oxysporum* f. [*F. bulbigenum* var.] *tracheiphilum* and *F. moniliforme* [*Gibberella fujikuroi*: **39**, 451]), never causing extensive damage. Taxonomic studies were made on anthracnose fungi, including *Colletotrichum truncatum* [cf. **36**, 10], *C. glycines*, *C. trifolii*, *Glomerella glycines* [**33**, 134] (shown not to be the perfect state of *C. truncatum* [cf. **33**, 637]), and *Gloeosporium* sp. One of the most widespread diseases is pod and stem blight (*Diaporthe phaseolorum* var. *sojae*) [cf. **9**, 83], but *D.p.* var. *caulivora* [map 360] has not yet been found in Japan. While purple seed stain (*Cercospora kikuchii*) [**37**, 260] is present in most areas, frog-eye (*C. sojina*) is a minor disease. Brown spot (*Septoria glycines*) [**19**, 452], downy mildew (*Peronospora manshurica*), and brown leaf-blotch (*Mycosphaerella sojae*) also occur and rust (*Phakopsora pachyrhizi*) causes severe damage locally [**15**, 401]. Other minor pathogens include leaf spots due to *Phyllosticta sojaecola* and *Ascochyta sojaecola*, a pod canker (*Macrophoma mame* [cf. **28**, 156]), blights (*Sclerotium rolfsii* and *Pellicularia filamentosa* [*Corticium solani*]), stem rot (*Sclerotinia sclerotiorum*), charcoal rot (*Macrophomina phaseoli*), and basal stem rot (*Ophionectria sojae*).

More than 20 fungi were isolated from soybean seeds, often with no visible symptoms, *D.p.* var. *sojae* and *Cercospora kikuchii* being prominent. Many of the spp. isolated caused pre- and post-emergence seedling diseases, soil-borne *S. rolfsii* being particularly damaging to seedlings.

Brown (J. C.), Holmes (R. S.), & Tiffin (L. O.). **Iron chlorosis in Soybeans as related to the genotype of rootstock : 3. Chlorosis susceptibility and reductive capacity at the root.**—*Soil Sci.*, **91**, 2, pp. 127–132, 1 fig., 3 graphs, 1961.

Further studies [cf. **39**, 523] involved the measurement in a mixture of 150 ml. aerated 10^{-4} M $K_3Fe(CN)_6$ and 10μc. Fe55 added as $FeCl_3$ of the reductive capacity of roots of Pl-54619–5–1 (susceptible) and Hawkeye (resistant) in relation to Fe chlorosis. In Fe-deficient Hawkeye roots the reductive capacity was greater and more Fe was absorbed than in Fe-sufficient or in Fe-deficient Pl. The max. degree of reduction occurred in intact plants. More Fe was absorbed by chlorotic than by non-chlorotic plants. From these results a relationship is deduced between the reductive capacity of the roots of the 2 vars., their capacity for Fe absorption, and their susceptibility to Fe chlorosis.

Vŭĭ-Yuĭ (D.). Прояви на мозайката при някои сортове Соя в България. [Occurrence of mosaic on some Soybean varieties in Bulgaria.]—Раст. Защ. [*Rast. Zasht.*], **9**, 1, pp. 20–26, 1961. [Russ., Engl. summ.]

A report from the agric. Inst. G. Dimitrov, Sofia, on the occurrence and identification of soybean mosaic virus.

Smartt (J.). **The diseases of Groundnuts in Northern Rhodesia.**—*Emp. J. exp. Agric.*, **29**, 113, pp. 79–87, 1961.

From Mount Makulu Central agric. Res. Sta. an account is given of the diseases recorded on the crops [**39**, 759], and of effective control measures. The most important are groundnut rosette virus and *Cercospora* leaf spots [*Mycosphaerella berkeleyi* and *M. arachidicola*: **40**, 8], which can generally be controlled satisfactorily by cultural methods, especially the destruction of volunteer plants.

Guba (E. F.), Young (R. E.), & Ui (T.). **Cavity spot disease of Carrot and Parsnip roots.**—*Plant Dis. Reptr*, **45**, 2, pp. 102–105, 8 fig., 1961.

From studies at Mass. agric. Exp. Sta., Waltham Field Sta., it was evident that Waltham Hicolor carrot possesses an inherent weakness to cavity spot. The cavities appear under the epidermis, which collapses and permits the entry of rot fungi and bacteria. Cavity spot is characteristic of a number of vars. and is most severe in seasons with high rainfall or in the presence of some form of malnutrition; it occurs more rarely on parsnips.

Chambers (S. C.). **Cover spraying for the control of Celery leaf spot—II.**—*J. Agric. W. Aust.*, **2** (Ser. 4), 2, pp. 158–159, 1961.

After further tests at Balcatta [**38**, 289], the author no longer recommends Bordeaux 4:4:40 throughout, as it causes discoloration of the foliage, but suggests ziram (1½ lb./100 gal.) for the last 2 applications before harvest.

De Varennes e Mendonça (Amarílis A.). **Um mosáico da Alface.** [A mosaic of Lettuce.]—*Agron. lusit.*, **21**, 2, pp. 103–121, 1 pl., 1959. [Engl. summ. 48 ref.]

A study of 4 virus isolates from lettuce mosaic from near Lisbon [cf. **31**, 367] showed these to behave similarly, to be mechanically transmitted only with difficulty, and to belong to the lettuce mosaic virus group.

Witkowski (Regine) & Grümmer (G.). **Beobachtungen an Puccinia tatarica Trazsch. auf Gewebekulturen von Lactuca tatarica (L.) C. A. Meyer.** [Observa-

tions on *P. tatarica* on tissue cultures of *L. tatarica*.]—*Z. allg. Mikrobiol.*, **1**, 1, pp. 79–82, 2 fig., 1960.

At Inst. für Agrobiologie, Ernst-Moritz-Arndt-Universität, Greifswald, Germany, *P. tatarica* produced on tissue cultures of *L. tatarica* on agar pycniospores, teleutospores, and a mycelium with isolated clamp-connexions. The diplophase proved to be particularly suitable for experiments. The teleutospores germinated without rest and formed viable sporidia. Light and chlorophyll were not essential to development provided there was an adequate supply of carbohydrates.

Under local conditions the rust perennates in the host and also overwinters by teleutospores; uredospores are lacking. Proceeding from an infection point, mostly along the leaf veins and vascular bundles, the mycelium is able to infect extensive areas, finally penetrating into the roots.

Sahtiyanci (Sehinaz), Gaertner (A.), & Fuchs (W. H.). **Zur Morphologie von Olpidium brassicae (Wor.) Dangeard.** [On the morphology of *O. brassicae*.]—*Arch. Mikrobiol.*, **35**, 4, pp. 379–383, 1 fig., 1960.

In studies at Inst. für Pflanzenpathologie und Pflanzenschutz, Georg-August-Univ., Göttingen, Germany, on the etiology of big-vein disease of lettuce 2 single-sporangial lines of *O. brassicae* [cf. **38**, 441; **39**, 761] were cultured on cabbage seedlings on which the chytrid went through several cycles of development. Preparations showed a variability of shape and size. One thallus could produce up to 12 discharge tubes.

Crossan (D. F.), Fieldhouse (D. J.), Burbutis (P. P.), Townsley (W. W.), & Vandenburgh (R.). **Control of Pepper bacterial spot by fertilizer and by foliar sprays.**—*Plant Dis. Reptr*, **45**, 2, pp. 120–123, 1961.

In 3 separate trials at Bridgeville, Georgetown, and Newark, Del., peppers (*Capsicum annuum*) receiving 1,500–5,000 lb. acre 10-10-10 or 6-12-12 fertilizer showed a reduction in leaf abscission and fruit spot caused by *Xanthomonas vesicatoria* [cf. **39**, 527]. Bacterial spot was severe at levels of 500–1,000 lb./acre, but applications of tribasic $CuSO_4$ or Bordeaux mixture gave good control.

Valenta (V.). **Echinocystis lobata — rezervoárová rastlina Uhorkovej mozaiky na Slovensku.** [*E. lobata*—a reservoir plant of Cucumber mosaic in Slovakia.]—*Biologia, Bratislava*, **15**, 3, pp. 217–220, 2 fig., 1960. [Russ., Germ. summ.]

Cucumber mosaic virus symptoms have been repeatedly observed on *E. lobata* [cf. **37**, 269] near Plešivec (S.E. Czechoslovakia). Virus isolates appeared to belong to the cucumber mosaic virus group; seeds are believed to transmit infection to cucumbers.

McLean (D. M.) & Meyer (H. M.). **A survey of cucurbit viruses in the lower Rio Grande Valley of Texas : Preliminary report.**—*Plant Dis. Reptr*, **45**, 2, pp. 137–139, 1961.

Of 140 virus samples from cucumber, squash, cantaloupe, melon, and watermelon tested during 1959–60 [cf. **38**, 646], 124 contained tobacco ringspot virus [**40**, 160], 18 watermelon mosaic [**36**, 299], 10 squash mosaic [loc. cit.], and 2 cucumber mosaic virus [**39**, 765].

Welvaert (W.). **De fusariose van Meloenen en zijn problemen.** [The fusariosis of Melons and its problems.]—*Verh. Rijkssta. PlZiekt., Gent*, 8, 53 pp., 1961. [Engl., Fr., Germ. summ., 38 ref. Cyclostyled.]

The str. of *F. oxysporum* var. [f.] *melonis* [cf. **39**, 147] causing melon wilt attacked only melons. Owing to the great sporulating ability of *F. oxysporum*, 1 diseased plant was found capable of infecting a whole plot. Tests *in vitro* with *Penicillium*

commune, *Trichoderma lignorum* [*T. viride*], and *Bacillus subtilis* revealed some antagonism to *Fusarium*, but this was too inconsistent to be of practical value. Infection was slower < 25° C. Eleven chemicals tested gave over 99% soil disinfection after 6 days, disinfection with formalin (0·5 l./sq. m.) and vapam (100 ml./sq. m.) considerably increasing production, but grafting on to *Cucurbita ficifolia* gave higher yields than soil disinfection.

Martinez (J. A.). **Contrôle do oídio em Aboboreira e Quiabeiro.** [Control of Oidium in Cucurbits and Okra.]—*Biológico*, **27**, 1, pp. 13–15, 1961.

Control of *Erysiphe cichoracearum* on cucurbits and okra (*Hibiscus esculentus*) was obtained with 0·06% wettable karathane powder, 0·03 and 0·06% karathane emulsion, and 0·35% thiovit. Treatments should be started at the first appearance of the disease and repeated at 10–15 day intervals or as the intensity of attack may demand, with 3–6 applications in all.

Mateescu (N.). **Aspecte din germinarea sporilor și creșterea miceliului ciupercii Psalliota campestris (L.) Fr.** [Aspects of spore germination and mycelial growth in the fungus *Agaricus bisporus*.] —*Comun. Bot., București, 1957–1959*, pp. 229–236, 4 fig., 1960. [Russ., Engl. summ.]

At Secț. exp. pentru cultura ciupercii comestibile, Bucharest, Romania, spores of the cultivated mushroom [*Agaricus bisporus*: cf. **30**, 260 and below] germinated only 2·3% (10 days after sowing) on Ricker medium at opt. temp. 24–28° C. and produced mycelium more slowly than cultured mycelial fragments [**39**, 766]. Mycelium from spores was still viable after 56 days and that developed vegetatively after 123 days.

Mateescu (N.). **Influența condițiilor de temperatură asupra creșterii și dezvoltării ciupercii Psalliota campestris (L.) Fr. in cultura de producție.** [Influence of temperature conditions on the growth and development of the fungus *Agaricus bisporus* cultivated for production.]

Hulea (A.) & Mateescu (N.). **Două boli semnalata în culturile de Ciupercii comestibile.** [Two diseases noticed in cultivation of edible Mushrooms.]—*Lucr. stiint., București*, **2** (*1959*), pp. 365–372; 373–378, 7 fig., 1960. [Russ., Fr., Engl. summ.]

Reports from a mushroom-growing establishment underground at Chitila fort, near Bucharest, Romania, the 1st concerning the influence of temp. and substrate; high summer temps. (22–23° C.) are inimical to growth [cf. above]. The 2nd concerns the occurrence of *Mycogone perniciosa* [**39**, 766] and *Verticillium* [*Cephalosporium*] *costantinii* [**25**, 93].

Ochs (Gertrud). **Vier Virusarten als Ursache der flavescence dorée der Rebe.** [Four virus species as the cause of golden flavescence of the Vine.]—*Naturwissenschaften*, **48**, 1, p. 26, 1961.

Golden flavescence or Baco 22-A disease [**39**, 455], a widespread threat principally to French viticulture [**40**, 451], was shown by studies in Baden to be caused by a complex of infectious panachure [**40**, 263], leaf deformation, canary-yellow discoloration, and leaf roll viruses [**38**, 557; **39**, 70; **40**, 141]. All the viruses except the last-named were determined by means of the test-plant method and every one electron-optically.

V. (P. A.). **La panachure.** [Panachure.]—*Progr. agric. vitic.*, **77**, 23, p. 286, 1 col. pl., 1960.

A note on various forms of yellowing found on vine leaves, with a brief description and coloured plate of virus 'panachure' [cf. **40**, 199 and above].

V. (P. A.). **Le pourridié.** [Root rot.]—*Progr. agric. vitic.*, **78**, 5, pp. 105–108, 1 col. pl., 2 fig., 1961.

A coloured plate is presented of vine foot rot, caused in France by *Armillariella* [*Armillaria*] *mellea* [**36**, 86; **38**, 118] and *Rosellinia necatrix* [**39**, 767]; other fungi associated with foot rots are briefly noted. Affected vines and adjacent plants should be dug up and not replaced by susceptible hosts.

Couey (H. M.) & Uota (M.). **The effect of environment on the toxic action of sulphur dioxide on the spores of Botrytis cinerea.**—Abs. in *Phytopathology*, **51**, 1, p. 64, 1961.

In studies for improving fumigation of table grapes SO_2 was 20 times as effective against *B. cinerea* at 96% R.H. as at 75%. For each 10° rise in temp. between 0 and 30° C. toxicity increased ×1·5 [cf. **37**, 756].

Boubals (D.) & Agulhon (R.). **Récents progrès de la lutte contre l'excoriose par traitement d'hiver.** [Recent progress in the control of excoriosis by winter treatment.]—*Progr. agric. vitic.*, **77**, 18, pp. 156–162, 1960.

Field and laboratory tests showed that the only effective products for the winter treatment of excoriosis (*Phoma flaccida*) [**36**, 635] on Aramon vine, a very susceptible var., were sodium arsenite in 0·5–5% solution, 6% anthracene oil, or 0·9–1% nitrated dyes (compounded from 3–5% ammonium nitrate and 20% ammonium 2–4 dinitrocresylate oxide). Sodium arsenite should be applied shortly before bud-burst and in dry weather. Annual winter treatment is recommended for vineyards particularly subject to attack.

Boubals (D.). **Produits de lutte contre le mildiou.** [Products for the control of downy mildew.]—*Progr. agric. vitic.*, **77**, 20, pp. 214–220, 1 fig., 1960.

A brief account of observations in 1960 during a visit to private and experimental vineyards in N. Italy sprayed with zineb (in comparison with Bordeaux mixture and zineb–Cu oxychloride) against downy mildew [*Plasmopara viticola*: cf. **39**, 271 *et passim*]. In 1960 Italian vine-growers used 10,000 'tonnes' [metric tons] of zineb, which appeared to give very favourable control, though it was noted that spraying tests in France are carried out under more exacting conditions than in Italy, where Bordeaux, if used, is weaker than in France. It is concluded, however, that zineb used at suitable dosages can generally provide very satisfactory protection against *P. viticola*.

Branas (J.). **Sur l'apoplexie de la Vigne.** [On Vine apoplexy.] *Progr. agric. vitic.*, **77**, 23, pp. 287–294, 2 fig., 1960.

The diagnostic features of apoplexy [**34**, 766; **39**, 151 *et passim*] are a sudden wilting of the foliage at the end of spring, a wide, brown, longitudinal stripe in the phloem and wood, and a rotting of the stem. It is associated with *Stereum hirsutum*, *S. purpureum*, *Phellinus* [*Fomes*] *igniarius*, and, possibly, other fungi. Control results from spraying pruning wounds in winter with a sodium arsenite (250 g./l.) wash.

Khristov (A.), Kotev (S.), & Kotovski (T.). Борбата с бактериалния рак по Лозата. [Control of crown gall of Vine.]—Раст. Защ. [*Rast. Zasht.*], **9**, 1, pp. 13–19, 1 graph, 1961. [Russ., Engl. summ. 39 ref.]

Crown gall [*Agrobacterium tumefaciens*] has been widespread on vine in Bulgaria in the last few years [cf. **34**, 706]. In tests by the agric. Inst. G. Dimitrov, Sofia, it was effectively controlled by dipping the affected stems up to the buds in 1 and 2% Na DNOC; 2% applied by brush to the tumours reduced infection from

20·19 to 0·179%. Its regular use on the main stems and branches immediately after pruning is recommended.

Raykov (E.). Чернилката по Лозата и начин за предпазване от нея. [Blackening of Vine and control measures.]—Лозарст. Винарст. [*Lozarst. Vinarst.*], **8**, 5, pp. 19–23, 1959. [Abs. in *Referat. Byull. Bolgar. nauch. Lit., Agric., For., Vet.*, **5**, 1, p. 99, 1960.]

At Pleven Inst. for Viticulture and Wine-Making, Bulgaria, a 2% germisan solution gave 90·5% protection from blackening when applied in the autumn after pruning and before earthing up for the winter. This control is recommended for production testing. It was established that the disorder is more frequent in sand in which diseased plants have grown than in bark and scions.

Proceedings of the Fourth International Congress of Crop Protection, Hamburg, September 1957. Vols. 1, 2.—xii+1912 pp. (2 vols.), numerous fig., diag., graphs, maps, Brunswick, 1959, 1960. 180 DM.

This publication (obtainable from the Library of the Biologische Bundesanstalt für Land- und Forstwirtschaft, Brunswick, Germany) contains the papers, mostly with discussions and ref. appended, presented to the 20 sections of the conference. The substance of some of them has been noticed. Following an introductory address by E. C. Stakman (Univ. Minn.; pp. 5–14), on progress and problems in the development of disease-resistant vars. of crop plants, are the 6 resolutions [Germ., Engl., Fr.] recorded at the conference (pp. 15–20). These include one on plant virus diseases and one on cereal rusts, the latter advocating international co-operation by the establishment of experimental rust nurseries throughout Europe and a current exchange of data obtained. Author and subject indexes are at the end of vol. 2.

Of the 6 papers of Sect. 1, devoted to plant protection in general, the following may be noted: H. Braun (Univ. Bonn) [Is plant quarantine at the present-day development of traffic still justified? Germ.] (pp. 21–24), dealing with some phytosanitary problems concerning import regulations. A. Guillaume (Univ. Strasbourg) [A new method of phytosanitary education. Fr.] (pp. 25–27), in which a 3-stage schedule according to the level required is proposed. J. P. P. Amaro (Lisbon) [Current development of phytopharmacy in Portugal. Fr.] (pp. 29–31). K. Tomur (Levent-Istanbul, Turkey) [The present-day question of plant protection in Tobacco cultivation in Turkey. Germ.] (pp. 37–40), which mentions the diseases and pests and indicates control.

Sect. 2 (30 papers) on microbial and non-parasitic plant diseases includes: M. Heimann (Geisenheim a. Rh.) [On the pathogenicity of *Pestalotia versicolor*, the causal agent of the die-back of Heather. Germ.] (pp. 57–61) [cf. **40**, 71]; V. Zacha (Brno, Czechoslovakia) [Parasitic fungal flora of Lucerne seed. Germ.] (p. 63); C. C. Georgescu & S. Orenski (Rom. Acad., Bucharest) [Morphological, cultural, and physiological investigations on the fungus *Ceratocystis ulmi*. Germ.] (pp. 65–69); E. Rădulescu (Cluj, Romania) [Change in the resistance of Wheat to stinking and loose smuts in relation to harvesting seed at different phases of maturity. Germ.] (pp. 109–113); with regard to *Tilletia foetida* vars. could be divided into 3 groups, susceptibility increasing or decreasing with maturity, or max. with harvest at the 'yellow-ripe' (intermediate) stage; susceptibility to *Ustilago tritici* [*U. nuda*] increased with lateness of harvest in the winter wheat Cenad 117 and was max. at 'yellow ripe' in the summer Marquis. R. S. Vasudeva, B. S. Bajaj, M. R. S. Iyengar, M. S. Chatrath, & P. L. Ganju (New Delhi) 'Mutagenic and stimulative effects of ionizing radiations on certain micro-organisms' (pp. 121–123); among those studied were *Colletotrichum falcatum* [*Glomerella tucumanensis*] and *U. nuda*. I. Granhall (Stockholm) [Current

problems of resistance breeding in Sweden. Germ.] (pp. 141–143), dealing in particular with cereal rusts, clover nematodes, and apple scab [*Venturia inaequalis*]. Mme T. I. Fedotova (Moscow, U.S.S.R.) 'Conditions for the development and preservation of disease resistance in hybrids and varieties' (pp. 165–168) [**37**, 331].

Of 14 papers in Sect. 3 on warning services and forecasting, several are devoted to apple scab (*V. inaequalis*) and potato blight (*Phytophthora infestans*), and the following may be noted: P. M. A. Bourke (Dublin) 'Modern meteorology and epidemiology of plant diseases' (pp. 169–174); P. Hus (Wageningen) [Scab warning service in the Netherlands. Germ.] (pp. 175–176); T. Săvulescu, Alice Săvulescu, Vera Bontea, & G. Savin (Bucharest) [Investigations on the application of forecasting and warning methods for the control of false mildew of Vine (*Plasmopara viticola*) during the period 1950–1956. Germ.] (pp. 177–191); F. Schnelle (Offenbach a. M.) [Meteorological aids in scab warning service. Germ.] (pp. 205–208); G. De Weille (Medan, Indonesia) 'Possibilities offered by the use of sunshine data for the purpose of forecasting epidemics of fungous plant diseases' (pp. 209–210), with special reference to *Exobasidium vexans* on tea [**40**, 323]; A. Soenen (Gorsem, Belgium) [The bases for warning in fruit cultivation. Fr.] (pp. 227–230); Miroslava Drachovská-Šimanová (Prague) [Comments on phytopathological prognosis with particular regard to the forecast of Beet pests and diseases. Germ.] (pp. 231–245) [cf. **40**, 12].

The 34 papers on viruses and virus diseases, which constitute Sect. 4, include: H. H. Thornberry (Univ. Ill., Urbana) 'Diagnosis of viral diseases, a proposal for standardized procedures' (pp. 257–258); M. S. Dunin (Moscow) 'On some methods of obtaining and applying antisera in phytopathological and entomological researches' (pp. 259–266) [cf. **37**, 525]; B. M. Gupta (Lucknow) 'Inhibition and alteration of virus infectivity in plants' (pp. 273–275); G. Melchers & L. Bergmann (Max Planck Inst., Tübingen) [Critical tests in the so-called chemotherapy of virus diseases. Germ.] (pp. 277–278); A. B. R. Beemster (Wageningen) 'The translocation of some viruses in *Physalis floridana* Rydb.' (pp. 297–301); A. Hey (Biol. Zentralanstalt, Berlin) [On population dynamics and vector capacity of leaf-roll-virus infected aphids (*Myzus persicae*) in vital and degenerate stands of Potato. Germ.] (pp. 303–308), the difference consisting in a different degree of density and of mobility of the vector; S. I. Martinov (Sofia) [Adjustment of Potato plants to diseases caused by viruses and new methods for the production of healthy seed tubers. Fr.] (pp. 309–312); B. A. Kvíčala & Jiřina Pfeiferová (Brno, Czechoslovakia) 'A contribution to the question of natural hosts of Potato virus X on non-solanaceous plants' (pp. 313–315), describing a new virus disease of *Chrysanthemum* in Czechoslovakia considered to be due to potato virus X; C. Wetter (Brunswick) [Examinations for the differentiation of various strains of Potato virus S. Germ.] (pp. 317–320) [cf. **36**, 780]; Aniela Kozłowska (Cracow, Poland) 'Investigation of Potato tubers by means of the conductometrical method' (pp. 321–324) [**38**, 249]; F. Sprau & W. Kanngiesser (Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich) [An electrophoretic examination of the soluble proteins of healthy and virus-infected plants and its significance for virus diagnosis. Germ.] (pp. 325–328); C. Blattný (Prague) [A contribution to the knowledge of the viruses of the stolbur group and their circulation in nature. Germ.] (pp. 335–341) [cf. **38**, 74; **40**, 268]; K.W. Kreitlow (Beltsville, Md.) 'A technique for screening White Clover for virus resistance' (pp. 355–357), based on a differential reaction of young seedlings to lucerne mosaic and bean yellow mosaic viruses; R. S. Vasudeva & H. S. Sahambi (New Delhi) 'Phyllody diseases transmitted by a species of *Deltocephalus* Burmeister' (pp. 359–360); O. Bode & O. Marcus (Brunswick) [Investigations on a virosis of *Atropa belladona*. Germ.] (pp. 375–376); V. Valenta (Bratislava, Czechoslovakia) [Attempt at a comparison of the viruses of the Aster yellows group. Germ.] (pp. 377–379) [cf. **38**, 74, 331];

H. Yoshii (Univ. Fukuoka) 'Recent studies on the virus diseases in Japan' (pp. 383–387); M. Panjan (Zagreb) [The problem of plant viroses in Yugoslavia. Germ.] (pp. 389–392).

In vol. 2 sect. 11 (6 papers) deals with the physical properties of pesticides and sect. 12 (15 papers) with analytic-chemical methods for their investigation. Sect. 15 (38 papers on fungicides) includes: J. G. Horsfall, S. Rich, & H. L. Keil (New Haven, Conn., and Philadelphia, Pa) 'Assaying foliage protection in the laboratory' (pp. 1373–1378); L. P. Miller & S. E. A. McCallan (Boyce Thompson Inst., N.Y.) 'Mechanism of action studies on the effect of fungitoxicants in destroying fungus conidia' (pp. 1379–1384); Mireille Moreau (Paris) [The impact of oxidizing enzymes on the fungicidal potency of some phenolic derivatives. Fr.] (pp. 1385–1387); J. Meierhans (Basel, Switzerland) [The influence of chemical-physical properties of fungicidal spraying materials on their biological effectiveness. Germ., Engl. summ.] (pp. 1407–1412); R. W. Marsh (Univ. Bristol), J. Kišpatić (Zagreb), M. Özkan (Ankara), E. A. Jamalainen (Tikkurila), and T. Lenartowicz (Skierniewice) report in separate papers (pp. 1417–1435) on fungicides used in England, Yugoslavia, Turkey, Finland, and Poland, respectively [last 4 Germ.]; E. M. Tilemans (Gembloux, Belgium) [Present stage of the disinfection of agricultural and horticultural seeds. Fr.] (pp. 1457–1462); B. Thellot & J. Thiollière (Lyon-Vaise, Rhône) [Ten years of experiments with methyl-mercury dicyandiamide as a seed disinfectant. Fr.] (pp. 1475–1481); C. Winner (Göttingen) [Differentiation of the effects of seed treatment materials in an experiment on the yield of Sugar Beet. Germ., Engl. summ.] (pp. 1483–1487); W. Nultsch (Univ. Tübingen) [A method for testing bactericidal steeping substances. Germ.] (pp. 1501–1503) [**38**, 555]; L. P. Flipse (Rotterdam). 'By-effects of pest control chemicals' (pp. 1505–1507); R. V. Blandy (Kenya) 'The effect of certain fungicides on transpiration rates and crop yields' (pp. 1513–1516), with an indication of some advantages of Hg over Cu compounds under tropical conditions.

Among the 15 papers of Sect. 16 on antibiotics are: O. A. Pohjakallio (Helsinki) [Investigations on the antagonists of the causal agents of plant diseases. Germ.] (pp. 1541–1543) [cf. **40**, 90]; Hedwig Köhler (Aschersleben) [Effect of the composition of nutrient solutions on the formation of antibiotics and phytotoxicity. Germ.] (pp. 1575–1579); F. Mach (Bot. Inst., Greifswald) [On synergistic relations between fungi and antibiotically active *Streptomyces* strs. Germ.] (pp. 1581–1582); H. W. Dölle (Griffith, N.S.W.) [Investigations on the colourless rhodomycin-forming strs. of *S. purpurascens*. Germ.] (pp. 1583–1586); R. C. Hildreth (La Lima, Honduras) 'The use of antibiotics for control of seed-borne bacterial blight of Beans' [*Phaseolus vulgaris*] (pp. 1587–1589), caused by *Xanthomonas phaseoli* and *Pseudomonas phaseolicola*; F. Wagner (Deggendorf, Germany) [Trials of a self-isolated *Streptomyces* antibiotic against various diseases of cereals. Germ.] (pp. 1591–1594); W. Krüger (Potchefstroom, S. Africa) [The effect of an antibiotic in Tomato on the biological demonstration of streptomycin. Germ.] (pp. 1595–1600).

Sect. 20 contains 15 papers on the technique of plant protection mechanization, technical problems of spraying and dusting, aerosol sprays, apparatus etc., and includes E. W. G. Van Den Muijzenberg (Wageningen) [The technique of spraying procedure in comparison with other methods of plant protection. Germ.] (pp. 1797–1800); A. Brixhe & R. Caussin (Brussels & Gembloux) [Application of pesticides by low-volume spraying. Fr.] (pp. 1819–1822); N. G. Shreeve (Weybridge, Surrey) 'Electrodusting' (pp. 1831–1834); H. Göhlich (Univ. Gottingen) [Electrostatic charge of plant protecting dusts and spray mists. Germ.] (pp. 1835–1841); J. G. Ten Houten & Mme M. C. Kerssen (Wageningen) 'Aerial spraying against late blight of Potatoes' (pp. 1843–1845); E. C. S. Little (U.N.O., Rangoon) 'Aerial spraying in New Zealand' (pp. 1851–1853).

New or uncommon plant diseases and pests.—*Plant Path.*, **10**, 1, pp. 39–42, 2 pl. (4 fig.), 1961.

T. F. Preece records that in Aug. 1960 scab (*Venturia inaequalis*) pustules were noted on the wood of a young leader on a 20-yr.-old unsprayed Bramley's Seedling apple tree at Harpenden. Wood scab has not before been reported on this var., but it apparently should not be assumed entirely free.

D. H. Lapwood reports finding *Phytophthora infestans* sporulating in tufts from the lenticels of Ulster Ensign potatoes and on crumbs of soil attached to the surface of unexposed, blighted tubers within the potato ridges.

H. J. Wilcox states that from dark pin-heads on both surfaces of the outer florets of the American spray var. of chrysanthemum Yellow Top *Peronospora radii* was isolated, this being, apparently, the 1st record of downy mildew on cultivated chrysanthemums.

Glaeser (Gertrud). **Das Auftreten wichtiger Schadenursachen an Kulturpflanzen in Österreich im Jahre 1960.** [The occurrence of important causes of injury to cultivated plants in Austria in the year 1960.]—*PflSchBer.*, **26**, 1–2, pp. 19–28, 1961. [Engl. summ.]

A report on the usual lines [cf. **40**, 7]. New records for the country were *Peronospora tabacina* on tobacco [map 23; **40**, 324], cherry rasp leaf virus on cherry [map 303], and black currant reversion virus.

Index of plant diseases in the United States.—*Agric. Handb. U.S. Dep. Agric.* 165, iv+531 pp., 2 maps, 1960. $3.75.

This publication replaces the 1950–53 Index [**32**, 580], with no change in content, but with some slight rearrangement. After an introductory note on the scope, form of nomenclature used, and method of covering geographical distribution, the diseases and indexes are arranged as before.

Nuzhdin (N. I.) (Ed.). Наследственность и изменчивость растений, животных и микроорганизмов. Том I. [Heredity and variability of plants, animals, and micro-organisms. Vol. I.]—815 pp., 3 pl. (2 col.), 11 fig., 13 diag., 38 graphs, Moscow, Publishers of the Academy of Sciences of the U.S.S.R., 1959. 65 roubles for the 2 vols. [Numerous ref.]

This vol., comprising part of the Transactions of a conference celebrating the 40th anniversary of the October Revolution (1957), produced under the auspices of the Inst. Genetics, Acad. Sci. U.S.S.R., contains 15 contributions to the plenary session (pp. 5–235), 32 on the genetics of micro-organisms (pp. 237–440), and 53 on the genetics of animals (pp. 441–811). Among these, in addition to those already noticed [**39**, 736; **40**, 29], are the following.

K. S. Sukhov [Genetic problems in virology.] (pp. 161–168). A general survey, with commentary, of recent studies and some remarks on the role of protein, RNA, and DNA of viruses [cf. **39**, 559, 736] and bacteriophages in infectious processes, and on the change of substances in the development of new generations.

F. T. Grinbaum [On hereditary and variability of pathogenic micro-organisms.] (pp. 239–244) is concerned primarily with medical work.

Mme E. F. Berezova [The plant as a factor in the variability of micro-organisms.] (pp. 411–415). A review from All-Union sci. Res. Inst. agric. Microb., Moscow, emphasizing the role of the host in the distribution and agency of its root microflora. This is illustrated by evaluating some relations between *Bacterium radiobacter*, non-host specific and without effect, *Ph*[*ytomonas*] [*Agrobacterium*] *tumefaciens*, and the leguminous nodule-forming bacteria. The regulation of the bacterial population by the plant is attributed chiefly to the nutritional and phytoncidal properties of root secretions.

E. S. Tatarenko & Mme I. P. Gerasimova [Hereditary variability of mould fungi.] (pp. 422–426). Studies by the Ukrainian sci. Res. Inst. Food Industry

showed that the variability of moulds depends on the conditions of growth, i.e. on the medium and ecological factors. Hereditary variability was manifest in the formation of variants, which usually occupied only certain sections or foci of the colony, this being characteristic of the *Aspergillus* and *Penicillium* strs. with velvety spore mats. Variants of most strs. with downy spore mats developed in foci simultaneously with the original form or 5–12 days after its development.

Ochse (J. J.), Soule (M. J.), Dijkman (M. J.), & Wehlburg (C.). **Tropical and subtropical agriculture.**—Vol. I, liv+760 pp.; Vol. II, xxii+pp. 761–1,446, numerous text fig., New York, The Macmillan Company, 1961. £12. 5*s*.

In this work, the purpose of which is to present a body of information about selected tropical and subtropical crops and related subjects in a brief but comprehensive form, Chapt. 1–6 (Part I) deal with climate, physiography, soils, cultural practices, etc., while Chapt. 7–14 (Part II) are concerned with the various crops. Each chapt. has a section on diseases and a list of selected ref.

Izrail'skiĭ (V. P.) (Ed.). Бактериальные болезни растений. [Bacterial diseases of plants.]—468 pp., 78 fig., Moscow, Sel'khozgiz, 1960. 2nd revised ed. Roubles 12.75. [30 pp. ref.]

This comprehensive monograph, based on Russian and world literature, is divided into a general part (pp. 7–177) on topics including the history of research on plant bacterioses in the U.S.S.R., the theory of infection, epiphytic microflora, immunity, antibiotics and phytoncides, the phenomena of bacteriophages in bacterial diseases of plants, the systematics of phytopathogenic bacteria and methods of studying them, and a special part (pp. 181–423) on bacterial diseases of specific hosts with chapt. contributed by specialist authors.

They give detailed information on the biology of the individual bacteria, their development, control, and distribution. M. V. Gorlenko [Bacterioses of cereal grasses.] (pp. 181–220) records the occurrence of *Xanthomonas translucens* var. *hordei* [? on barley] at Omsk, Tomsk, Alma-Ata, and Tashkent; *Pseudomonas atrofaciens* [map 369] on wheat in the Krasnodar and Stavropol' areas, Kabardino-Balkaria, N. Ossetia, Kharkov, Voronezh, Saratov, Ivanovo, Kursk, Kirovo, Minsk, and Mogilev regions, W. Siberia, W. Kazakhstan, and in the Moscow and Leningrad regions; *X. translucens* var. *secalis* [? on rye] in the Omsk region; and *P. coronafaciens* [map 356] on oats in all oat growing areas of the U.S.S.R., including Central Asia. V. P. Izrail'skiĭ deals with [Bacterioses of leguminous crops.] (pp. 221–241). Contributions in [Bacterial diseases of technical crops.] (pp. 242–289] are by Mme K. I. Bel'tyukova on cotton, V. P. Murav'ev on beet, and S. E. Grushevoĭ on tobacco and makhorka, and include reference to *P. tabaci* [map 293] in W. Georgia (with Abkhazia and Adzharia), the Krasnodar area, the forest-steppe zone of the Ukraine, and in the central regions of the Russian Federal Republic. V. I. Izrail'skiĭ covers [Bacterial diseases of root and tuber crops.] (pp. 290–311) and Mme E. A. Osnitskaya [Bacterioses of tomatoes.] (pp. 312–330), with records of *X. vesicatoria* [map 269] in S. Kazakhstan, the Caucasus, the Altai and Krasnodar areas, the Rostov, Moscow, Voronezh, and Gor'kovskaya regions, the Ukraine, and the Soviet Far East, and *Corynebacterium michiganense* [map 26], which has spread as far as W. Siberia and the Crimea. M. V. Gorlenko [Bacterioses of cucurbits. Bacterioses of cabbage and other crucifers.] (pp. 331–342; 343–353), cites *P. lacrymans* [map 355] as the most serious disease in almost all cucurbit growing areas of the U.S.S.R., and its var. *melonis* in Kazakhstan, Tajikistan, Georgia, and the Altai. V. P. Izrail'skiĭ [Bacterial diseases of fruit and other trees.] (pp. 354–423) includes a new sp., *Bacterium armeniacum* Mirzabekjan [**38**, 574] on apricot (p. 397), found on a fruit farm in Armenia in 1938. There are tables of biochemical characters (pp. 424–431) and a subject index (pp. 464–65).

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FUNGICIDES. Information on fungicides is now noticed in *Pesticides Abstracts and News Summary*, Section C, published by Colonial Pesticides Information Service, 56–62, Gray's Inn Rd., London, W.C. 1.

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